THE GAS JOURNAL

DECEMBER 23, 1931

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To All Our Readers—
A Happy Christmastide

London's Gas Bills

THE Gas Light and Coke, the South Metropolitan, and the Commercial Gas Companies are all promoting Private Bills in Parliament—in addition to the South Suburban Company, whose proposals for the transfer to them of the undertakings of the Sevenoaks Gas Company and the Tonbridge Gas Company were referred to in the editorial columns of last week's issue of the "JOURNAL." Though not dealing with an amalgamation, the Gas Light and Coke Company's Bill, like that of the South Suburban Company, involves an extension of the limits of supply—the proposal being to include the urban district of Canvey Island, which adjoins the Company's existing limits of supply. Lands within the urban district are scheduled upon which the Company desire powers to manufacture and store gas and to deal with residual products. For the purpose of conveying gas to or from the added limits, &c., authority is sought to lay pipes under water. The price within the added limits is not to exceed 1s. 4d. per therm. There are also provisions relating to the making and maintenance of wharves, landing stages, and jetties.

The South Metropolitan Company are seeking permission from time to time to issue, for general purposes, additional nominal capital to such amount as shall be sufficient to produce, after taking into account any premiums or discounts, a sum not exceeding in the whole £1,000,000, by the creation of ordinary or preference stock. At present the Company have an authorized capital of £8,747,395, of which £7,845,707 has been issued. There is outstanding debenture stock to the amount of £2,895,445. The Commercial Company's Bill contains a number of clauses dealing with matters relating to capital and various questions of administration. One clause is with regard to the sale of stock by auction or tender. Another is to permit the Company to appoint a person possessing professional, technical, commercial, financial, or scientific knowledge advantageous to the conduct of gas undertakings as an additional Director of the Company. Any such additional Director may be appointed for such period as the Directors think fit, and shall not be subject to retirement by rotation; and the Directors at any time may remove or dismiss any such additional Director from office and appoint another in his place.

Other Interesting Proposals

AMONG other interesting proposals, a Bill to confer further powers upon the Kettering Gas Company contains the following clause to prohibit the making by the Kettering Urban District Council of conditions as to the form of light, heat, power, or energy to be supplied or used in certain cases:

> The Council shall not, in or in connection with the selling, leasing, letting, or other disposal of any house, shop, office, warehouse, or other building, or any lands for the time being belonging or leased to them —(*a*) make or impose any term, condition, or restriction with respect to (i) the form of light, heat, power, or energy to be supplied to or used in any such house, shop, office, warehouse, or other building, or on any such lands or in any building erected on any such lands; or (ii) the taking from any particular local authority, company, body, or person of any form of light, heat, power, or energy; (*b*) give any preference or priority to any person on account of his taking or agreeing to take or subject to any prejudice or disadvantage any person not taking or not agreeing to take a supply of light, heat, power, or energy of any particular form or from any particular local authority, company, body, or person.

The Brownhills Urban District Council are seeking authority for the transfer to them of the undertaking of the Ogley Hay and Brownhills Gas Company, Ltd. The terms and conditions are to be such as may be agreed upon between the Company and the Council, or as shall be determined by arbitration; and the purchase is to be completed on or before April 1, 1933. The Council have been considering the purchase of the undertaking since a proposal was made about a year ago by the Company for the sale of their interests to the adjoining Cannock, Hednesford, and District Gas Company. It is felt by the Council that, if the Brownhills undertaking is to be transferred to other hands, the proper persons to have charge are those representing the ratepayers of the area, and having as their concern the welfare of the district as a whole. From a news paragraph appearing in this issue, it will be noted that the Council's proposal is meeting with opposition in the town.

Reciprocal Guarantees

THERE are at the present time on the market three types of domestic dry meter—lights, standard, and high-capacity. Do we need them all? This is one of the questions raised by Mr. J. H. Bingham, of Messrs. George Glover, Ltd., in a contribution published in this issue of the "JOURNAL." Originally there were four sizes of lights meters; then came four sizes of the Standard brand; now we have a further four ratings in the high-capacity class. This treble trouble has distressed the makers, Mr. Bingham explains. It maintains production costs on a comparatively high level, and definitely impedes the work of standardization. For our part, we fail to see why some gas managers should still favour the lights meter, as we are assured they do. Comparatively it occupies much valuable room in times when houses can hardly be termed spacious, and its capacity dubs it as something hardly modern in times of the geyser, cooker, and fire as a composite installation in many houses. At the same time it is realized that the meter has a long life, and no gas undertaking could afford to replace all existing equipment every time a development was brought into practical shape and put on the market. All efforts should be made, however, to assist the manufacturers in cheapening the cost of the meter, which is no small item in total distribution charges.

Actually, during the past few years, the meter manufacturers have greatly decreased the cost of measuring gas. This can best be illustrated as follows, the quotation being from Mr. Bingham's paper: "Assume for purposes of comparison that a 5-light meter had a total output of 100,000 c.ft. in five years, and that the initial cost of the meter was, say, £2 10s., then the meter cost per 1000 c.ft. would be 6d. This assumes too that the meter has scrap value only at the end of the period. Under the same conditions of guarantee a 120 c.ft. high-capacity meter working an equivalent number of hours as the 5-light and at the same relative average load, would be expected to give a total output of 400,000 c.ft. Taking the initial cost of the high capacity as the same as the lights type (although the cost of the former is slightly higher), the meter cost per 1000 c.ft. of gas measured would be only 1½d."

Now this brings Mr. Bingham to his main contention—that any guarantee given by the makers should be conditional on the meter not being worked beyond what he terms its "safe working load." We have on many occasions, and for many reasons, advocated the installation of meters of adequate capacity, capable of meeting peak load demands when all the appliances in the service are in full use; and we think that Mr. Bingham puts forward a fair case for some form of reciprocal guarantee based on these considerations.

Diluting Straight Coal Gas

THIS year there have been several papers and many discussions at meetings of the Senior Associations on the subject of diluting straight coal gas. The question has now been tackled by the Junior Associations, and in this issue of the "JOURNAL" two accounts are given of the practice followed at the Hertford and the Tamworth works, where in each case horizontal settings are employed as carbonizing units, and where 500 B.Th.U. is the calorific value supplied to the town. Of the two methods, we think there will be general agreement that Hertford's is the better. At the Tamworth Works air to the extent of 14 p.ct. is added to the coal gas, with the result that the mixed gas contains 24 p.ct. of inerts and an oxygen figure of 3·6 p.ct. The effect of such a high oxygen content on the distribution system cannot be other than harmful. There is, however, one most praiseworthy feature of Tamworth's gas supply—the calorific value of the gas supplied does not vary. This fact is of the greatest importance to the consumer, who is concerned not about what happens inside mains, services, and meters, but about what takes place when he turns the tap and lights the gas in his appliance. Uniformity of supply is a *sine quâ non* of customer satisfaction, and Tamworth are definitely doing the right thing in ensuring this uniformity. The paper by Mr. Tildesley explains clearly how this is being effected automatically by a simple piece of regulating mechanism. The only criticism we have to offer is that this ingenious apparatus should be working on some diluting medium other than air.

The gas supplied at Hertford contains 22 p.ct. of inerts, but the oxygen content is only 0·3 p.ct. From these figures it will be obvious that the diluting medium is producer gas. Hertford's system of working is described by Mr. C. A. Deas. Blue water gas was first employed as diluent, but it had two disadvantages: It was too costly, and it reduced considerably the coke available for sale—and Hertford enjoys an excellent domestic coke market. Then experiments were conducted using producer gas from the internal producer, which, however, did not show satisfactory results. Finally, the problem was overcome by employing producer gas generated externally. The cost of the producer gas therm is given as 1·55d., but the author excludes interest and depreciation of the plant, for reasons which will be clear from the paper. Actually, regarding the question of producer gas manufacture *per se*—for it cannot be assumed that every small works has a stand-by water gas plant—allowance ought to be made for interest and depreciation. In any case this allowance would be slight, for even in small works no difficulty should be experienced in fixing an outside producer worked either under suction provided by the exhauster or under pressure by a simple steam injector.

At Hertford the capacity of the retort bench, working to a 500 B.Th.U. gas, has been increased by 8·2 p.ct. by the addition of producer gas, and the coke yield has been reduced by ½ cwt. per ton of coal carbonized. Of course, in regard to producer gas addition instead of blue water gas dilution, the increase in specific gravity of the mixed gas with the former represents a reduction of about 7 p.ct. in the gas delivering capacity of the main—a factor which cannot always be ignored. Mr. Deas is using coke as fuel for his producer gas, but mentions that his undertaking is at present considering the advisability, from both working and financial points of view, of installing plant to gasify breeze, and thus produce sufficient gas for heating the setting and for dilution purposes.

Tale of the Rates

ONCE again we are indebted to Mr. W. Allison Davies, Borough Treasurer of Preston, for his comparative statement of rates levied in various towns, together with certain other statistics. The places included are divided up into county boroughs, boroughs, and urban districts; while in a separate table are the figures for 28 Metropolitan boroughs. Here we find that the rates for 1931-32 (except in the few cases in which they are equal) are lower than those for 1930-31. Poplar remains at the top, with a figure of 16s. 8d. in the pound; but even here a drop from 19s. is exhibited. At the other end of the scale is Westminster, with 8s. 9d., as against 9s. 5d.

There are included in the return 84 county boroughs, the average rates of which, at 12s. 11¾d. in the pound for 1931-32, are about 2d. less than was the case a year ago. The average rates for the 106 boroughs named are 12s. 6d. in the pound on the present occasion, which figure compares with 12s. 11½d. for 1930-31. In the case of 85 urban districts there has been an even more substantial decrease in the total rates levied—from 13s. 6½d. in the year 1930-31, to 12s. 9¾d. for 1931-32. Merthyr Tydfil has been able to get but 4d. in the pound off its rates, which still figure at 25s. 4d. Jarrow, on the other hand, has added 4d., making the total 19s.—a figure which is exceeded in several other instances.

At Aberdare the rates, though down by 2s., are still 20s. in the pound; while at Caerphilly they remain the same at 23s. 6d., and the Rhondda is also stationary at 23s., and Norwich remains at 19s. 8d. Of course, the figures of total rates in the pound levied are not the same thing as the rates per head of population, which are low in some cases where the rates in the pound are high. Some of the figures quoted here speak eloquently of distressful industrial conditions.

Correspondence

Flueless But Not Flawless

SIR,—The construction of an increasing number of houses which contain rooms without flues prompts me to warn architects and local authorities of the dangers to health caused by lack of adequate ventilation.

To preserve a healthy atmosphere it is essential that there should be a well-maintained movement of air through a room, to get rid of microbes exhaled by the occupants and the fine dust particles stirred up by their movements. While it is true that when a flueless room is shut up, sufficient air usually passes through the doors and crevices to prevent any lack of oxygen, nevertheless this is quite insufficient to move dust and microbes.

A steady inflow of cool air from an open window is, of course, the best thing. Such air will keep the occupants of a room fresh and lively, and thus more efficient for work, while warm moist air has the disadvantage of lessening bodily vigour and causing a disinclination for work.

Unfortunately, people in this country are, quite wrongly, afraid of open windows, and it is on this account that flues are so essential to healthy houses. The tendency to eliminate them must be laid at the door of those local authorities and others who are insisting upon electricity as the only form of heating allowed in the houses for which they are responsible. Put no flue in a room, they seem to argue, and the only form of heating that can possibly be used is electricity. On economic grounds and on health grounds alike, I deprecate this tendency most strongly.

It is very difficult to get a room comfortably warm from electric sources of heat with reasonable economy, while, as to the health aspect of the matter, it must be remembered that the rays thrown off by sources of heat such as the dull red glow of electric fires or from hot-water pipes and anthracite stoves, make the skin (unless damp) uncomfortable and irritable. Acting through the skin, these rays cause congestion of the nose and breathing passages, and this may contribute to catarrhal complaints. Luminous sources of heat of a glowing red nature, such as the glow from the best modern gas fires or incandescent lamps, give off rays which leave the skin comfortable and keep the breathing passages open. From our experience here, we know that the rays emitted by such incandescent lamps and gas fires neutralize the uncomfortable effects of those from darker infra-red sources of heat. Cool moving air acting on the face likewise relieves the discomfort arising from dull red or dark sources of heat.

LEONARD HILL,
General Supervisor.

The London Light and Electrical Clinic,
Ranelagh Road, London, S.W. 1,
Dec. 15, 1931.

PERSONAL

Mr. ALEXANDER JAMIESON, Assistant Engineer and Manager, Gas-Works, Coatbridge, has been appointed Engineer and Manager at Johnstone in succession to Mr. W. A. Dearden, who has been appointed Engineer and Manager at Lancaster.

Some 300 people over 65 were entertained at Adlington on Saturday, as guests of Mr. and Mrs. T. CROSTON, to commemorate the fact that it is 21 years since Mr. Croston was first appointed Chairman of Adlington Council. He is Chairman of Adlington Gas Company, with which he has been connected 40 years.

After the usual business meeting on Dec. 9, the members of the Commercial Section (Western District) of the North British Association presented their Chairman, Mr. W. A. DEARDEN, with an oak bookcase, suitably inscribed, in honour of his being appointed Gas Engineer and Manager to the Lancaster Corporation. Mr. H. G. Ritchie (Falkirk) occupied the chair, and Mr. J. Campbell (Dunfermline) made the presentation.

The Lord President of the Council has appointed Mr. F. S. SINNATT, M.B.E., D.Sc., F.I.C., to be Director of Fuel Research under the Department of Scientific and Industrial Research. Dr. Sinnatt has been Assistant Director of Fuel Research since 1924. Previously he was Lecturer on Fuels in the University of Manchester Faculty of Technology, and Director of Research to the Lancashire and Cheshire Coal Research Association.

Forthcoming Engagements.

Dec. 29.—B.C.G.A.—Education for Gas Salesmen Committee, 11.30 a.m.; Gas Commercial Education Committee, 2.30 p.m.

Jan. 9.—SCOTTISH JUNIOR ASSOCIATION.—Joint Meeting in Edinburgh. Address by Mr. T. M. Ashford, Senior Smoke Inspector, Glasgow.

Jan. 9.—LONDON AND SOUTHERN DISTRICT JUNIOR ASSOCIATION.—Visit to the Home Office Museum, London.

Jan. 9.—WESTERN JUNIOR ASSOCIATION.—Meeting in Exeter. Paper by Mr. J. H. Dyde on "Coke in Relation to its Domestic Use."

Jan. 14.—MIDLAND JUNIOR ASSOCIATION.—Paper by Mr. J. C. Cotterill, of Worcester, on "Notes on Water Softening Plants."

Jan. 20.—B.C.G.A.—Executive Committee Meeting, 11 a.m.

Jan. 20.—B.C.G.A.—General Committee Meeting, 2.30 p.m.

Jan. 29.—LONDON AND SOUTHERN DISTRICT JUNIOR ASSOCIATION.—Meeting in London. Paper by Mr. Roy Summerson, "Exhausting and Governing Gas from Retorts."

REVIEWS

GAS AND WATER ENGINEERS' CALENDAR, 1932.*

The first volume of this indispensable pocket book is issued in wallet form and, as is the case each year, has been brought up-to-date throughout. The most noticeable alterations are in the lists of gas and water undertakings since changes of personnel or annual make have had to be recorded in numerous instances. A welcome new feature is the addition of Belgium to the long list of European countries of which particulars of the individual undertakings are given. New legislation affecting the German Gas Industry is naturally also summarized.

The second volume is issued at irregular intervals, the previous edition having been that of 1929. The book with its many pages and its small though beautifully clear type provides a mine of useful information covering most aspects of the activities of gas and water undertakings. Among the features are mathematical tables, specifications and dimensions for all types of mains, sections devoted to boilers, steam engines, electrical plant, physical constants, combustion, carbonization in all its aspects, bye-products, purification and distribution of gas, utilization of gas, analytical methods, and the testing, bacteriological examination, treatment and distribution of water.

A large number of the DIN specifications have been reproduced and the recent VDI monograph on the measurement of gases by means of orifice plates and nozzles is abstracted very fully. This section should be of considerable interest since this method of measurement is liable to give very inaccurate results if the aperture of the orifice is not suited to the pipe diameter and the gas velocity. Standard methods for testing the efficiency of gas-making plant and gas appliances are also included.

Dehydration of gas would appear not to have made such rapid strides in Germany as has been the case in this country if one can judge from the fact that this subject is dismissed very briefly. In other respects, however, the Gas Industry in Germany is evidently well up-to-date.

* Kalender für das Gas- und Wasserfach, 55th Edition, 1932. [Munich and Berlin: R. Oldenbourg. Part I., pp. 382; price RM. 5, bound. Part II., pp. 793; price RM. 7·50, unbound.]

THE "PARLIAMENTARY GAZETTE."

The "Parliamentary Gazette" has completed its 27th year of publication by the issue of the latest edition covering the last Session of 1931. This book, edited and published by James Howarth, 21, Elmfield Mansions, S.W. 17, is compiled from official sources by Parliamentary Journalists and Statisticians, and is sold at 5s., or a subscription of 20s. for the four issues (payable in advance).

THE NEWS OF THE WEEK

The Wednesbury Town Council have decided that all the worn out street lamps shall in future be replaced by up-to-date lights with a view to improving the lighting of main roads. Lighting by electricity has been abandoned on the grounds of cost and unsuitability.

A Four-Days' Exhibition of gas appliances was held recently at Haddington by the British Electric Traction Company, who own a group of gas undertakings in the Lothians, including the Haddington Gas Company. Dr. W. R. Martine, Chairman of the Company, opened the exhibition.

"Costing in Relation to the Manufacture of Gas" was the subject of a paper read before a meeting of the Southern Association of Gas Engineers and Managers (Eastern Division) by Major R. N. Barnett, A.S.A.A., Chief Accountant of the South Metropolitan Gas Company, on Wednesday, Dec. 16.

The Annual Dinner of the Illuminating Engineering Society will be held at the Trocadero Restaurant, Piccadilly, London, W., at 7.30 p.m., on Tuesday, Feb. 9, 1932 (the anniversary of the foundation of the Society). Tickets (price 12s. 6d., exclusive of wine) may be obtained from the Hon. Secretary, Mr. J. S. Dow, 32, Victoria Street, London, S.W. 1.

The Extension of the Bromley (Kent) Gas-Works, it is understood, is under contemplation by the South Suburban Gas Company. Two or three years ago a piece of land in close proximity to the works was purchased. The Company now intend to ask for powers from Parliament to erect further plant on the site, and notices to this effect have been served on owners of property within a certain radius, together with an intimation that any objection must be made within a certain time.

"City Lights."—In connection with the run of the well-known film "City Lights" in Stockton-on-Tees, featuring that inimitable comedian, Charlie Chaplin, the City Gas Department took the opportunity of doing a little "stunt" advertising in their new gas showroom window, the central theme being a cut-out of the star performer in characteristic attitude and supported by appropriate slogans, such as "Charlie and Gas—Both Lead in City Lights," and "All this week our local cinemas are showing the world's favourite in 'City Lights.' In this window we show you the world's best light—GAS LIGHT." We understand that the window proved a great attraction.

The Employees of the Newcastle and Gateshead Gas Company have during the past year raised over £1000 in aid of the medical charities of Tyneside. The Gas Company's employees make weekly contributions to a special fund, and in 1931 subscribed £1010, which is about £8 less than in 1930. The contributions from the various departments of the Company this year were: Elswick gas-works, £138; Redheugh gas-works, £207; Howdon gas-works, £84; St. Anthony's bye-product works, £26; Newcastle Distribution Department, £272; Wallsend Distribution Department, £41; Chester-le-Street Distribution Department, £5; North Shields works and Tynemouth Distribution Departments, £160; chief and branch office staffs, £72. Over 40 medical and charitable institutions have benefited from the fund.

Brighter Lighting for Christmas Shoppers.

Brighter street lighting for Christmas shoppers in Lambeth and Lewisham is being provided.

Additional high-pressure gas lamps, installed throughout Clapham Road, were "switched on" for the first time on Thursday, Dec. 17, while a scheme for improved lighting by centrally-suspended high-pressure gas lamps of all the main roads at Lewisham will also be completed this week. The last part of this scheme has involved the lighting of nearly two miles of Lee High Road by centrally-suspended 1000 candle-power lamps which were turned on for the first time at the end of last week.

It is estimated that there are now more than five hundred of these overhead high-pressure lamps in use in Central and South London.

Institution of Gas Engineers.

Members of the Institution are invited to attend the 22nd Annual Exhibition of Scientific Instruments and Apparatus arranged by the Physical Society and the Optical Society at the Imperial College of Science and Technology, Imperial Institute Road, South Kensington, S.W. 7, on Jan. 5, 6, and 7, 1932, at 3 p.m. to 6 p.m. and 7 p.m. to 10 p.m.

Sir Oliver J. Lodge will deliver a discourse on "Reminiscences" in the large Physics Lecture Theatre on Jan. 7 at 8 p.m.

Tickets of admission for Jan. 5 and 6 may be obtained from the Secretary of the Institution, 28, Grosvenor Gardens, London, S.W. 1, from whom copies of the catalogue may be obtained, price 9d. each, including postage.

Tickets of admission for Jan. 7 are not required.

Copies of the following recently issued British Standard Specifications may be obtained, price 2s. each, including postage, from the Institution of Gas Engineers, 28, Grosvenor Gardens, London, S.W. 1: Forge welded steel air receivers (No. 428-1931); rivetted steel air receivers (No. 429-1931); and solid drawn steel air receivers (No. 430-1931).

Copies of the following Specifications may also be obtained, price 2s. each, including postage: No. 431-1931, Manila Ropes for General Purposes; and No. 432-1931, Manila Ropes for Well Drilling.

Society of British Gas Industries.

A Meeting of the Council was held at 56, Victoria Street, Westminster, S.W. 1, on Dec. 17—Dr. E. W. Smith, the Chairman, presiding. Those present were: Messrs. E. J. Fox, C. A. Goodall, H. E. Bennet, T. F. C. Potterton, A. Comley, T. A. Clapham, R. J. Milbourne, Frank West, W. H. Handley, B. B. Waller, H. M. Thornton, L. Hartley, F. J. Gould (Hon. Treasurer), E. J. Davison (Hon. Secretary), and Arthur L. Griffith (Secretary). Apologies for absence were reported from: Col. E. A. Wilson, Alderman G. Clark, Messrs. J. Orme, D. W. Turner, W. J. Gardner, and F. C. Tilley.

The following representatives of the Society were unanimously re-elected to serve on the Grand Council of the Federation of British Industries for the ensuing year:—

Main Group 2 (Sub-Group 5).—General Mechanical Engineering: Mr. E. J. Davison.

" " 2 (" 12).—Coke Ovens, Gas Conveying, and Chemical Plant: Mr. Samuel Cutler.

" " 2 (" 13).—Heating and Cooking Apparatus: Mr Charles Clare.

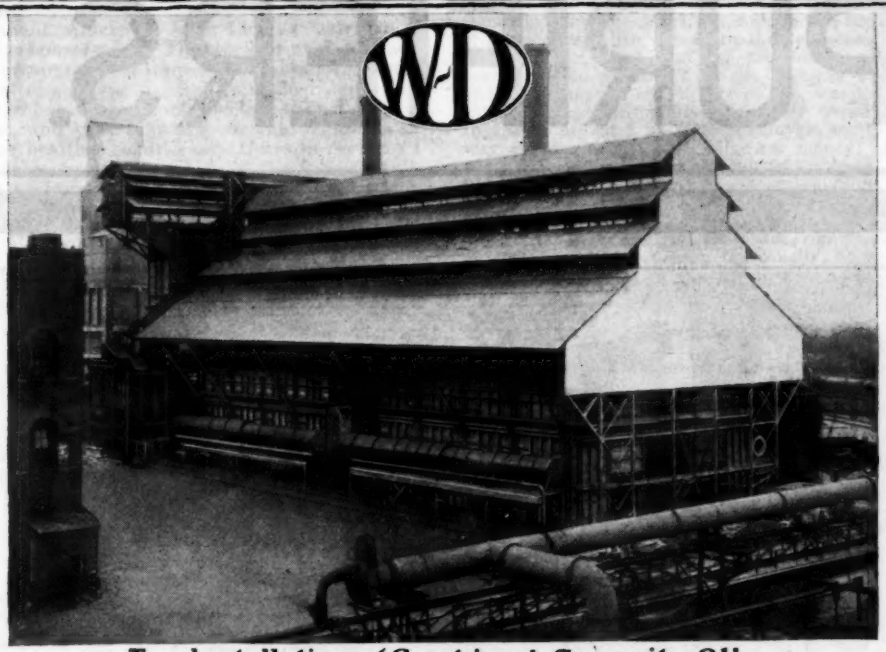
" " 15 (" 1).—Gas Appliances—(1) Gas Mantles, (2) Gas Fittings: Mr. F. C. Tilley.

At the request of the British Commercial Gas Association to appoint a representative of the Society as a member of the Gas Commercial Education Committee, Mr. H. M. Thornton, J.P., was appointed as the Society's representative.

The Chairman reported the arrangements for the Gas Industries Section at the British Industries Fair, Birmingham, 1932, and stated that matters are now well advanced.

Income-Tax.

To assist any of their employees who find that the income-tax payment places them in a position of real difficulty, Messrs. Alder & Mackay, Ltd., are prepared, on this occasion only, to advance them the necessary funds for payment of the tax on Jan. 1, and deduct it from wages and salaries for the ensuing three months. This means that the debt must be repaid to the Company before March 31, and will, of course, be free of interest.



Two Installations (Combined Capacity 9½ million Cu.Ft. per day) erected at the Southall Station, Gas Light & Coke Company

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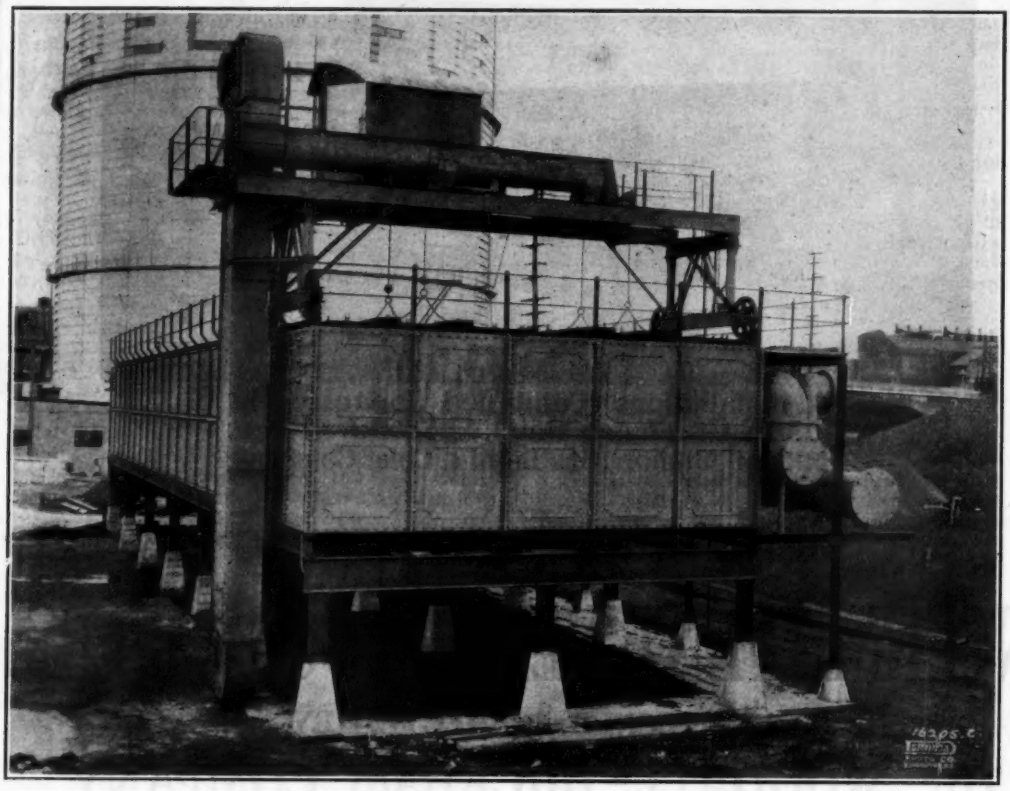

Four Purifiers 25' 0" square by 10' 0" deep, erected on Joist Structure, complete with 30" diameter main Inlet and Outlet Pipes; 24" diameter single Weck Valves; 30" diameter Main Reverser Valves, and OXIDE HANDLING PLANT, erected at the Gasworks, Vancouver, British Columbia.

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A Christmas Message.

In his Christmas message to the employees of the Birmingham Gas Department, Alderman J. H. Lloyd (Chairman of the Gas Committee) observes: "The world-wide depression in trade has unfortunately continued throughout the year, so that the output of gas has slightly diminished, but there is now beginning to be a more hopeful feeling that the worst has been reached, and that 1932 may be the beginning of a return to more healthy conditions. If trade revives, I am happy to be able to say that I have the fullest confidence that our Gas Department will be able to meet successfully whatever demands are made upon its resources.

"The service that we are able to render both to home and workshop is being more and more fully realized, and it is a great satisfaction to know that we have such a loyal body of workers, able and willing to render every assistance to make that service as complete as possible in every direction."

Building a Gas-Works.

Referring to the novel Christmas Competition for the building of a gas-works, of which we gave full details in our last issue (pp. 717, 727, 728), we have been asked to state that any Engineers or Managers who have not received a set, either by inadvertence or through change of address, may have a set on application.

Midland Junior Association Visit Dudley.

About 50 members of the Midland Junior Gas Association paid a visit to the Dudley Gas-Works on Saturday, Dec. 5, at the invitation of the Directors of the Dudley, Brierley Hill, and District Gas Company. The visitors were welcomed on arrival by the Engineer and Managing Director, Mr. F. C. Briggs, A.M.Inst.C.E.

The following is a brief description of the works: Coal is received at the public railway sidings and transported by tipping steam lorries to the works. The carbonizing plant consists of sixteen Glover-West 40-in. vertical retorts. Both coal and coke are handled by a lip bucket conveyor. There are Galloway waste-heat boilers which provide the whole of the power for operating machinery and for steaming the retorts. There is, in addition, a carburetted water gas plant complete, consisting of two Humphreys & Glasgow sets of 300,000 c.ft. per day capacity, purifiers, meters, &c., with the usual auxiliary machinery and boilers.

Following the inspection of the works the members were entertained at tea in the Lecture Room of the Dudley Showrooms, when the President of the Association, Mr. W. L. S. Spinks, extended the thanks of all present to the Directors and staff of the Company for what they had done to make the visit so enjoyable. The Deputy Chairman, Mr. W. H. Thompson, responded on behalf of the Company.

British Road Tar Association.

At the invitation of the Lancashire District Tar Board of the British Road Tar Association a considerable number of representatives of municipal and urban district council highway authorities were invited to view the Association's "talkie" film entitled: "Coal Mine to Road," at the Theatre Royal Cinema, Manchester, on Friday, Dec. 18.

A luncheon was subsequently given at the Midland Hotel, Manchester.

Luncheon Speeches.

Lieut.-Col. Sir JOSEPH NALL, in proposing the toast of "The Highways Authorities of Lancashire and Cheshire," said he only knew of tar as a road user, and as a medium whereby he might be enabled to travel at a speed which but for the tar on the road might bring him within the scope of certain clauses of the new Road Traffic Act. The tar industry was doing something which was to the general advantage of the people of this country, in that it reacted to the benefit, in particular, of coal mining and the cost of gas, and it was producing safer and better roads than many of those that they had been accustomed to ride upon and walk upon in the past.

Col. W. M. CARR, in seconding the toast, said the Association appealed to everyone to "Buy British Products," and not send money out of the country and pay dole to the miner; because the more British tar there was used in the country, the more British coal would be carbonized. Many coke ovens were in operation not for the production of gas at all, but simply for the production of solid fuel and tar, and the more there was a market for the tar at home the more coke ovens would come into commission. We did not want to be dependent upon the American creosote market for keeping our home industries going, and neither ought we to be dependent upon the French pitch market.

Lieut.-Col. E. B. MARTIN, D.S.O. (City Engineer, Salford), responded to the toast. He said there had been a certain amount of controversy with regard to the respective merits of the tar producing undertakings and the bitumen producing undertakings. The position that the highway authorities took up, and he thought it was a correct one, was that they would not subsidize depressed industries. They would expend the funds that were provided by their ratepayers for the roads in such a way as to give the best value for money; and if they could get better value for money out of bitumen, then they would use bitumen. If they could get better value for money out of tar products, then they would use tar products. Like everything else the highway authorities were quite as concerned about supporting home industries. There was, rightly enough, a prejudice against importing bitumen. Personally, he was whole-heartedly for the use of tar; he was advising his own Corporation to use tar, and he was using exceedingly little bitumen. Therefore, what he was going to say must be coloured by that remark. It was contended by the gas undertakings, and he thought it was emphasized a little too much, that by using bitumen as against tar we employed foreign labour as against home labour. Was this actually so? The average cost of bitumen in this country was about £5 10s. He believed we used 500,000 tons of it per annum. Of that £5 10s. which it cost when highway authorities bought it, the cost of transport in British vessels was £1 5s. 6d., while port dues were in the neighbourhood of 1s. 6d. The cost of refining and distribution in England was £1 10s. The cost of steel packages, etc., British made, was £1 5s. He was neglecting the pence. Thus the total cost was about £4 2s. 8d. spent in Britain, as against the actual £5 10s. that we paid for the finished article.

It was better for the Gas Industry to face facts. Although he was personally of opinion that tar roads were far less slippery than bitumen roads it was folly to be blinded to the extent of saying that tar must be used because it was a British product, and cut out the bitumen. The amount of bitumen used in the United Kingdom was approximately 500,000 tons, and out of every 100,000 tons that came into the country 60,000 tons came from our Colonies, leaving 40,000 from elsewhere. Therefore, the argument that we were using tar because it was patriotic to use it was not quite sound. The argument that we were using tar because it was better was absolutely sound, and would receive the support of most highway engineers.

Mr. NORMAN HOLDEN (Lancashire Tar Distillers, Limited) proposed a vote of thanks to Sir Joseph Nall for presiding over the proceedings. He urged that by using British tar highway authorities were receiving absolute value for their money, and as most of those present represented Lancashire and Cheshire he would like to point out that no better tar could be obtainable anywhere than was produced in those counties.

Sir JOSEPH NALL briefly responded to the vote of thanks, and the proceedings concluded.

Three Progressive Undertakings.

Three gas undertakings have received attention in the "Potential Investments" column of recent issues of the "Financial Times"—the Hornsey Gas Company, the Lowestoft Water and Gas Company, and the Exeter Gaslight and Coke Company.

The Hornsey Gas Company, it was stated, was incorporated by Special Act in 1866, and supplies the thickly populated suburban districts of Hornsey, Crouch End, Harringay, Muswell Hill, Stroud Green, and Highgate.

Since May, 1925, the statutory fixed standard price of gas has been 12d. per therm, and dividends on the 5 p.ct. and 3½ p.ct. ordinary stocks are subject to the usual sliding scale according as the price varies to the extent of 0·2d. from the standard rate.

The Lowestoft Water and Gas Company, it was mentioned, was incorporated in 1853 as the Lowestoft Water, Gas, and Market Company, and the name changed in 1897. The Company supplies water to the town and ten neighbouring places, and gas in Lowestoft, Pakefield, and Oulton Broad. Legislation is now being sought for power to extend the limits of supply.

The statutory fixed maximum price of gas is 20·8d. per therm and the price at December last was 15·625d. Dividends are not subject to a sliding scale, and the maximum distributions on the ordinary shares have been paid since 1925.

The Exeter Gaslight and Coke Company, it was stated, was incorporated by Special Act in 1816, and supplies the City of Exeter and the parishes of Alphington, Ide, Pinhoe, Broadclyst, and Topsham, the supply of the last-named area being taken over as from Christmas, 1926. The statutory standard price of gas is fixed at 16·8d. per therm, and the price at the end of 1930 was 8d. Ordinary dividends are subject to the usual sliding scale.

To enable the regularly increasing demand for gas to be adequately met, a considerable amount of capital has been spent in the last few years. During 1927, £50,000 of debentures were issued to pay for the installation of en-

THE NEWS—continued.

larged manufacturing plant and distributing mains, and since then a new gasholder to contain 2 million c.ft. has been constructed to provide the necessary additional storage. This entailed the issue of £47,500 in new ordinary shares in May, 1930. For many years sales have steadily increased.

Reconstruction of Stockton Gas-Works.

The Stockton Town Council have approved a recommendation to proceed with the reconstruction of the retort house at the gas-works and to install new retorts at an estimated cost of £47,764. Application will be made for sanction to raise a loan. The Gas Manager, Mr. W. W. Atley, reported that unless the new retorts were installed by next summer there would be a possibility of a shortage of supply in the winter of 1932.

Councillor Coates, in opposing the scheme, said that in 1921 the debt on the gas-works was £45,621, and to-day it was £256,538. It was stated, in reply, that the Council had themselves to blame for the increase in capital debt because of their policy over many years in taking surplus on the undertaking for rate relief.

The Council has received sanction from the Ministry of Health to borrow £1083 for defraying the excess expenditure for the adaption of the gas showrooms in High Street.

World's Largest Christmas Pudding Cooked by Gas.

Everything is now ready for the boiling of the world's largest Christmas Empire pudding at Morecambe.

Many people who, at the outset, were inclined to ridicule the event, have now realized that after all it is going to be a unique and interesting proceeding which has already secured nation wide publicity for the Borough's Christmas festivities

At a meeting of the Carnival Committee (who are "organizing the Pudding") the Chairman (Mr. Walter Bell) reported that a large wrought-iron boiler, which had been purchased from Messrs. Ward's, had been tested that day and the capacity of 900 gallons of water had reached boiling point. The boiler will be painted and lettered, and the Gas Department will take advantage of this to tell the public that the "pudding is cooked by gas."

By the help of the Metropolitan Fuel Company, of London, the cooking is a simple matter, for by their modern apparatus, high-pressure gas will bring the pudding "to the boil" in an hour and a half.

Brownhills Gas Undertaking.

Opposition to Purchase by Urban Council.

There were animated proceedings at a meeting of ratepayers at Brownhills on Wednesday last to consider a proposal by the Brownhills Urban District Council to promote a Bill in Parliament to purchase the local gas undertaking.

Mr. H. V. Emery, Vice-Chairman of the Council, presided, and the Clerk (Mr. N. Wain) explained that the Council's proposals were first put forward when it became known that the Cannock Gas Company were making overtures with a view to absorbing the Brownhills undertaking. The Cannock Company had obtained an Order from the Board of Trade to enable them to carry this out, but the Board of Trade had directed that the Order should be null and void if the Brownhills Council's was passed by Parliament.

A resolution authorizing the Council to proceed with the proposed Bill met with considerable opposition, speakers saying that there was no prospect of any adequate return for the cost which would be involved and that the ultimate result was likely to be that the undertaking would become a burden on the rates.

Emphasis was laid on the fact that owing to the emigration of people from the mining districts the population of Brownhills was declining, so that the prospect of any future development which would justify the Council's proposed enterprise was extremely remote.

Mr. J. B. Lane, speaking with twenty years' experience of gas undertakings, advised electors to oppose the purchase. If Cannock Gas Company purchased the Brownhills undertaking they would within twelve months install a new high-pressure main which would enable Brownhills to have cheaper gas.

Mr. Bradbury (Brownhills), dealing with the balance-sheet of the local gas concern, said that after paying dividend in 1930 there was a balance of only £14 2s. 9d. to be carried forward. There was also a bank overdraft of £2600. A profit of £1109 on £15,000 capital was not sufficient. It would cost the Council between £30,000 and £40,000 to take over the undertaking and to carry out the needed modernization of the plant and other works.

When questions were answered on behalf of the Council, it was stated that one of the ablest engineers in the country had advised that the undertaking was a sound one and would prove profitable to the local authorities. The estimated cost of the Bill was £1000, but the action of the Council in promoting the Bill had already enabled the authority to secure a saving of £400 per annum in the cost of gas purchases, assuming Cannock Company's Bill were a success. Compensation to retiring Directors of the Company would be £250 each for three Directors.

With regard to the overdraft referred to, it was pointed out that against that had to be set £5000 spent out of revenue.

On a vote the resolution was defeated by 102 to 67. It was stated that a poll would probably be demanded whichever way the vote went.

A New System of Carbonization.

Last week, at the Savoy Hotel, Sir Eric Hambro gave a luncheon at the Savoy Hotel in honour of Commendatore Piero Salerni, the Italian scientist, who, at the Third International Congress on Bituminous Coal, organized by the Carnegie Institute and held in Pittsburg, U.S.A., in November, disclosed a process which he had developed for the low-temperature carbonization of coal.

The Chairman said the greatest trouble of our mines was that fine coal, which formed a large percentage of their output, fetched an insufficient price, and, in some instances, could not be sold at all. Experts had long agreed that, if a system of low-temperature carbonization were available which could be generally applied, it would provide the remedy, as by such treatment fine coal could be turned into fuel of a value not merely equal to that of lump coal, but superior to it. This could be done if, in addition to the home market for solid fuel, the coal-mining industry could take into its orbit a large part of the market which was now supplied by imported oil. Low-temperature carbonization could give the means of achieving this.

How Salerni set to work and how he reached success was set out in the papers which he (Commendatore Salerni) and Prof. Wheeler, of Sheffield University, presented to the Congress at Pittsburg. Prof. Wheeler's paper [an extract from this will be found on later pages] contained the following momentous declaration: "It is difficult not to conclude that by the Salerni system the admittedly difficult problem of low-temperature carbonization has been effectively solved. It provides a solution of the problem so complete as to render the treatment of all bituminous coal for use in grates economically practicable."

He saw in it the salvation of the coal industry. Obviously, however, the present was no time to ask for finance from the Government or even from the public, and he decided, therefore, to shoulder himself the responsibility for the provision of the initial funds. It might appear that in doing this he was departing from the traditions of British banking, whose sound rule it had been to finance only well-established industries. This was not so, for he was acting in this case not as a banker, but as a private individual who realized the country's urgent need for action.

[According to the "Financial Times," Sir Eric Hambro, who is financing the development of the Salerni low-temperature carbonization process, has announced that in the first week of the new year he intends to make a tour of the chief mining centres of Great Britain. He is anxious to see this new industry in full swing before long.]

Glover-West Verticals at Stornoway.

The Directors of the Lewis Castle Trust, comprising Provost Maclennan (Chairman), Bailie H. M. Matheson, Bailie W. J. Tolmie, ex-Provost Smith, and Councillor Mackenzie, with Mr. Aldred, Secretary, and Mr. Arnott, Manager, attended the formal inspection and inauguration of the new installation of Glover-West vertical retorts and auxiliary apparatus at the Stornoway Gas-Works on Friday, Dec. 4.

Bailie Matheson, deputizing for the Provost as Convener of the Lighting Committee of the Town Council, charged one retort with coal, and, in the course of a brief speech, said that in doing this he was bringing into operation a gas-making plant which, he understood, was the last word in modern gas engineering practice.

The company then proceeded to examine the details of

THE NEWS—*continued.*

the installation, and inspected the new exhausters and purifiers, and the re-arranged and reconstructed condensers; Mr. Arnott explaining the various features of interest about the new plant and apparatus.

The new carbonizing plant comprises two Glover-West vertical retorts of the 33-in. New Model design, arranged in single units, each of which is separately controlled and heated, the capacity being such that only one retort will be in operation throughout the major portion of the year, the second retort acting as a standby which would be brought into operation during scurfing periods.

The minimum output from the plant is about 30,000 c.ft. of gas per diem, while the maximum output from both retorts is in the neighbourhood of 150,000 c.ft. per diem. The annual make of gas at the Stornoway Gas-Works is round about 14 million c.ft., the calorific value of the gas being 400 B.Th.U. (gross) per c.ft.

This installation is of particular interest, as it constitutes the smallest Glover-West installation in existence, and, even for the short time the plant has been operating, it demonstrates that the continuous vertical retort can now be successfully installed and economically operated in works of much smaller capacity than had hitherto been thought possible.

The new and reconstructed auxiliary plant comprises one set of Waller's exhausters in duplicate, steam driven, each capable of handling 10,000 c.ft. of gas per hour, fitted up in a particularly roomy exhauster house; a set of four 10 ft. square water-lute purifiers; and two atmospheric condensers which were previously in operation but have been dismantled, inspected, thoroughly repaired where necessary, and re-erected on a new site.

At a luncheon subsequent to the ceremony, Provost MACLENNAN said it was very proper that Bailie Matheson who was Convener of the Lighting Committee of the Town Council, should perform the inauguration ceremony by cutting the silk ribbon and charging one of the retorts, and he had to thank him for doing this on his (the Provost's) behalf. Messrs. West's Gas Improvement Company, of Manchester, were to be congratulated upon the promptitude and efficiency displayed in the erection and putting into operation of the installation in so short a time. They were now in a position to manufacture gas of a quality second to none, and they trusted that their troubles with the gas supply in Stornoway were at an end. There had been a lot of work done during the past eight months, and he was sure that this work had not been without its worries and difficulties. Mr. Arnott, their Manager, had done very well indeed in having all the connections completed in time for that day's ceremony.

Bailie MATHESON thanked the Provost for the kind way in which he had referred to him. He assured the Provost that he had performed this duty with the greatest pleasure because he remembered that the definite motion which impelled them as a Gas Undertaking to take the necessary steps to set their house in order had been moved by him (Bailie Matheson). When they came to the decision as to what they were going to do, taking into account that there was no industry which had advanced to such an extent scientifically as the Gas Industry, he thought that before they proceeded any further they should make inquiry from the leading engineering firms whether vertical retorts could be applied to their limited requirements. Mr. Arnott, after due investigation, decided in favour of the Glover-West system of vertical retorts, and got into communication with the makers.

To put matters in a nutshell, they in those days could be compared to an ailing patient. It was necessary to call in the doctor, a drastic operation was advised, and the surgeon was called in, and now they were in the hands of a capable nurse, Mr. Arnott, who was rapidly bringing the patient back to a state of health and prosperity.

Bailie Tolmie, ex-Provost Smith, and Councillor A. J. Mackenzie associated themselves with these congratulations, and Mr. Arnott thanked the Provost and other speakers for the kind way in which they had recognized his work. He was sure that no matter how painstaking he might be in his work he could only bring these reconstructions to the fruition which they deserved if he continued to receive the hearty support of his Board.

: EXHIBITION :

ALL-GAS HOUSES

As a means of propaganda, and an account of practical results obtained by this means by the Liverpool Gas Company.

It has been said that propaganda is nine-tenths publicity; but the publicity must be timely, of the right character, and deliberately designed to impress its message upon that section of the community most responsive to the appeal.

As a result of the excellent propaganda already carried out, the advantages of gas for heating and lighting are matters of general knowledge. The problem now is—How can propaganda be brought to bear in particular upon people about to (1) rent or buy a house for the first time; (2) re-furnish; (3) remove to another house; or who are (4) enjoying a larger income, and therefore in a position to improve their household equipment. If such people can be reached effectively and at the right moment, then the sale of gas fittings and the consumption of gas is certain to be influenced favourably.

For the past three years the Liverpool Gas Company have taken part in a series of Exhibition Houses organized by the "Liverpool Evening Express." These have all been typical suburban villas or bungalows, well-furnished and equipped, and after exhibition have been sold to the public in the ordinary way. Local firms carry out the decoration, complete the garden and lawn, and loan furniture, carpets, curtains, musical instruments, kitchen utensils, and bathroom fixtures, while the Gas Company fit gas fires, radiators, cooker, dish-warmer, refrigerator, gas iron, wash boiler and geyser, and supply gas to the fittings during the period of exhibition. In several cases an "all-gas" house was organized, with gas as the only source of illumination and heat, each pendant or bracket being fitted with by-pass and switch.

Now, an Exhibition House is ideal propaganda in that it appeals directly to the four groups of people already described; and although there is nothing very new in an exhibition house as such, the Liverpool Gas Company go farther than this, in co-operating with the local Press, who are able to give publicity powerful enough to guarantee the success of any exhibition. The many advantages of having Press co-operation are explained by Mr. J. Sandon Stubbs, F.C.I.S., Secretary and Treasurer of the Liverpool Gas Company, as follows: "First of all the Exhibition receives wide-spread publicity in advance, and features are written-up a week or two before the opening ceremony. These editorials are planned to arouse public interest. Next, circulars are distributed throughout the district. Then the opening ceremony is performed by some prominent lady—leader of society, actress, or well-known and popular person locally. For instance, the last 'all-gas' house was opened by Alderman Mabel Fletcher, J.P. Pictures of the ceremony, a full account of the exhibits, and reports of the speeches, appear in the local Press as 'news.' During the Exhibition, the 'Evening Express' publishes frequent editorials dealing with various home topics, referring to the exhibits, with helpful advice about home furnishing and equipment. The public are constantly reminded of the Exhibition and advised to pay it a visit. Direction bills are posted along the route, so that strangers have no difficulty whatever in finding the house. Then there is always a competition, the entry forms for which are given free of charge to visitors. This competition focusses attention upon various details—prices, finishes, and sizes; and from the number of forms issued, we know how many people have visited the house.

"As far as expense is concerned, the cost to the Gas Company is comparatively small. We take advertising space in the special issues of the newspaper, and then there is the cost of gas consumed by our own fittings. We obtain further publicity by sending an invitation to all of our ordinary consumers, over 90,000 in number, with their gas bills. As postage is being incurred in any case, this involves no expense except the cost of printing. Then, in addition, we co-operate with the builder by issuing jointly with him a small leaflet giving details of his

Typical of the homely everyday surroundings in which gas apparatus are displayed in Exhibition Houses by the Liverpool Gas Company.

houses and our gas appliances. We lend and fix the various apparatus, but in most cases these are bought *in situ* by the individuals who purchase the houses at the conclusion of each exhibition.

" Inquiries begin to reach our showrooms within a day or two of the opening ceremony. We can trace very definite sales from each exhibition, and people from towns as far as thirty miles away come in to buy gas fires and other fittings. We have a sales representative at the exhibition house of course, who keeps a record of all inquiries, and these are followed-up by our Staff in the ordinary way. But it is rather surprising how many people mention Exhibition House months after the exhibition has concluded. Almost 16,000 people visited the last ' all-gas ' house during its four weeks' run. Gas managers and their staffs have come from the surrounding areas to visit these houses."

The " all-gas " houses as equipped by the Liverpool Gas Company are a revelation in comfort, educating people to the multitudinous uses of gas, encouraging householders to utilize all the latest appliances, and emphasizing the benefits of switches and by-passes. As the visitor enters, he is at once impressed by the warmth of the hall—it radiates hospitality, with more than a hint of luxury. In each guest's room is a gas fire, welcome after a long journey by road or rail, still more welcome when dressing on a cold wintry morning. Impressions such as these are powerful sales arguments, which can be admirably brought home in the completely furnished show house.

Another very powerful argument which can be strongly emphasized in an " all-gas " house is proper installation. In the houses equipped by the Liverpool Gas Company there are no projecting pipes, no unsightly and obvious bulges in the walls, caused by what are quite evidently " after-thoughts." This appeals very strongly to practical housewives, and can be used as a conclusive argument in favour of having the home properly equipped for gas heating and gas lighting *before* the decorations are completed.

IN CONTINENTAL COUNTRIES - - -

Abstract Translations from the Technical Press of France and Germany.

APPLICATION OF XANTHATES TO THE REMOVAL OF SHALE AND CLAY FROM COAL SLURRY.

An investigation of the xanthate process, originally proposed by Kühlwein in 1929 is described by W. Petersen in " Glückauf," 1931, 67, 1445—1453 (Nov. 21).

When sodium carbonate and potassium xanthate are added to slurry, the shale and clay are much more readily loosened from the surface of the coal particles; hence slurry screens act more efficiently as regards giving rise to a product much less contaminated with dirt and lower in moisture content. A similar beneficial result is obtained in froth flotation processes. The amount of sodium carbonate may be 0·1—0·4 p.ct. by weight on the dry slurry and that of the potassium xanthate 0·01—0·04 p.ct.—*i.e.*, one-tenth of the weight of sodium carbonate. The weight of reagents required increases with increase in the ash and clay content of the slurry. An excess of reagents is prejudicial, but decrease of the carbonate-xanthate ratio from 10 : 1 to 5 : 1 has but slight effect on the results. A further reduction in the ratio, or use of xanthate alone, gives results no different from those which would be obtained without any addition of reagents. A certain degree of alkalinity of the system is therefore necessary. A contact time of 2—7 minutes prior to screening is necessary, and a screening period of 0·5—2 minutes gives the best results, the times depending on the content of ash and clay.

The adsorption of xanthate on the surface of the coal loosens the adhesion of the shale and especially of the clay and the alkali is then able to deflocculate and peptize these impurities. The reduction of the water content of the slurry recovered, compared with what would be realized without this special treatment, is a natural consequence of the reduction in the ash content.

THE "JOURNAL" TECHNICAL RECORD

Which contains Reports of Meetings of Gas and Allied Associations

London and Southern District Junior Gas Association

A meeting of this Association was held at the Westminster Technical Institute on Friday, Dec. 11—Mr. J. HOWARD GOLDSMITH, the President, in the chair. Two short papers were given—"Dilution of Straight Coal Gas by Producer Gas," by Mr. C. A. Deas, of Hertford; and "Modern Public Lighting by Gas," by Mr. C. I. Winstone, of the Gas Light and Coke Company.

An extract from Mr. Deas' paper is published to-day, together with the discussion, while Mr. Winstone's contribution will be given later.

DILUTION OF STRAIGHT COAL GAS BY PRODUCER GAS.

By C. A. DEAS, Assistant Engineer, Hertford and District Gas Company.

[EXTRACT.]

The writer hopes that these notes, in conjunction with the ensuing discussion, will prove of interest and value to Engineers desiring to produce a 450-550 B.Th.U. gas from horizontal retorts without recourse to the objectionable practice of overpulling or the addition of air, with its consequent undesirable effects, water gas or Tully gas, &c., not being available, or desired on economic grounds, as a diluent.

The bench at Hertford consists of six beds of seven 22 in. by 16 in. Ω shaped stop-end retorts 9 ft. 9 in. long.

Blue water gas was first used as a diluent and proved quite satisfactory, but had the great disadvantage that it was more costly than coal gas to manufacture, and also that it considerably reduced the coke available for sale; and as we have an excellent domestic coke market, due to the introduction of cutting and grading plant, it became clear that some more economical method of dilution was to be desired.

The present system was first put into operation in July, 1930.

The plant in which the producer gas is now made is a Humphreys & Glasgow C.W.G. plant which has been fitted with a Meldrum steam blower. The addition of the blower, &c., does not in any way interfere with the operation of the plant for the manufacture of water gas, and it has the advantage that the plant, being under fire, can be making blue gas in a matter of minutes or a fully carburetted gas in about 15-20 minutes.

Coking is carried out at 4½-hourly intervals in 2½-cwt. charges.

At first the fire was cleaned every day whether it worked 8 or the full 24 hours, but we now find it a distinct advantage to clean the fire only after 36 hours' gas-making. During last winter we successfully used furnace coke with ash contents of the order of 13 p.ct., no gas coke being available, owing to the excellent domestic market developed locally.

Later are given particulars of test runs on the plant for varying periods. Test A was carried out using the blower with the standard steam jet as supplied by the makers. Tests B and C were carried out using the same blower fitted with a jet having a smaller orifice. A comparison of the results obtained in Test A with those of Tests B and C shows a marked increase in therms per ton of coke and calorific value of the gas, together with a large decrease in the amount of steam used and a slight increase in the throughput of the plant.

It will be observed that the hydrogen content of this gas is higher than the figures usually obtained for producer gas, this being no doubt due to the steam used to inject the air.

With a view to utilizing a lower grade fuel, experiments have been made using breeze. These experiments were tried with the object of determining the possible efficiency of such fuel and whether the installation of a plant, with mechanical grate capable of handling this type of fuel, would be justified, it being realized that working would be impossible with a static grate unless of special design.

Tests.

—	A.	B.	C.
Type of fuel	Gas coke, screened over 2 in. and through 3 in.	Gas coke, primary breeze only removed	Gas coke, primary breeze only removed
Duration of test	28 days	14 days	17 days
Total gas made	1,673,300 c.ft.	866,100 c.ft.	1,196,000 c.ft.
Total coke used	20,934 lbs.	11,200 lbs.	15,680 lbs.
Lbs. of coke gasified per hour	64	66	72
Lbs. of coke per 1000 c.ft.	12·5	12·9	13·1
Total steam used, calculated	18,148 lbs.	6,060 lbs.	7,720 lbs.
Lbs. of steam per 1000 c.ft.	10·8	7·0	6·5
Average C V. of gas, calculated	116 B.Th U.	133 B.Th.U.	133 B.Th,U.
Average ash content of coke used	5·4 p.ct.	6 p.ct.	6·5 p.ct.
Therms per ton of coke as used	207	228	227
Size of steam orifice in blower	⅛ in.	3/32 in.	3/32 in.
Temperature of steam-air mixture	72° C.	63° C.	62° C.

The average composition of the gas made in these tests was as follows:

CO_2	11·0	7·7	7·1
O_2	0·0	0·0	0·0
CO	18·5	23·8	25·1
H_2	16·9	15·8	14·5
CH_4	0·3	0·7	0·6
N_2	53·3	52·0	52·7

The quality of the gas made from breeze was quite satisfactory, but there was found to be a great tendency for a centre core of unburned dust and smalls to form; gasification occurring chiefly on the periphery of the fuel bed. The greatest difficulty was encountered when attempts were made to clean the fire, for immediately the fire was disturbed large quantities ran out of the clinker door and the experiment had to be abandoned.

Attempts were also made to gasify a mixture of coke and breeze but proved a failure, chiefly due to the tendency of the fines to run to the centre of the fire and form an unburnt core which also ran out of the clinker door when the fire was disturbed by cleaning operations.

There are several plants on the market for gasifying breeze—*e.g.*, Trefois, &c.—but on making inquiries we found that for a plant to suit our requirements the cost was prohibitive, though there would appear to be no doubt that, on a larger works, the installation of plant for gasifying breeze would pay for itself in a very short period.

We are, however, at present considering the advisability, both from the working and financial side, of putting down plant to gasify breeze and thus produce sufficient gas for heating the retort settings and diluting the coal gas from these settings.

COSTS.

The cost of manufacturing producer gas therms compares very favourably with that of other gaseous therms.

The costs at Hertford are as follows:

	£ s. d.
Cost of 1 ton of coke, including elevating to charging floor	1 7 6
Steam required for injector, 1150 lbs. at 8·3d. per 1000 lbs.	0 0 9
Labour charges, 1s. per ton of coke for cleaning fire, pumping syphons, &c.	0 1 0
Total cost of gasifying 1 ton of coke	£1 9 3

1 ton of coke produces 171,000 c.ft. of gas at 133 B.Th.U. = 227 therms

∴ cost per therm = 1·55d.

As regards maintenance charges these are practically negligible.

There is, of course, the question of interest and depreciation charges, but these charges could not justifiably be debited against the cost of the producer gas made, as they would still be payable if the plant was used in its original capacity as a stand-by.

Our plant has worked under producer gas conditions for 16 months during which time it has gasified 140 tons of coke. No charges whatever have been incurred for maintenance other than a new nozzle for the blower. If the generator lining required to be renewed (which is not at present indicated) this charge would only amount to 15·4d. per ton of coke or 0·07d. per therm.

If, of course, breeze could be used as a fuel, the cost per therm figures would be considerably reduced, depending on market value of breeze. There would, however, be a somewhat higher maintenance charge to be met, owing to the necessity of employing a mechanical grate.

An installation large enough to warrant the putting down of a mechanical producer and with breeze at 10s. per ton, it should be possible to manufacture producer gas therms at something like 1d. each.

The amount of producer gas required to bring down our rich horizontal retort gas to our standard of 500 B.Th.U. averages 29 p.ct.

The average compositions of the gases are as follows:

Constituent.	Coal Gas.	Producer Gas.	Mixed Gas.
CO_2	1·5	7·4	3·2
O_2	0·4	0·0	0·3
CO	6·3	24·5	11·6
C_nH_m	4·0	..	2·8
H_2	44·6	15·1	36·0
CH_4	38·7	0·6	27·6
N_2	4·5	52·4	18·5
Calorific value, B.Th.U. per c.ft.	650 (calculated)	133 (calculated)	500 (observed)
Specific gravity	0·45 ,,	0·89 (observed)	0·575 ,,
P.ct. by volume	71	29	100
P.ct. by therms	92·4	7·6	100

N.B.—Analyses include air added for purification.

A consideration of the above figures reveals the fact that the thermal capacity of the retort bench has been increased by 8·2 p.ct. due to the addition of producer gas to bring the coal gas down to a 500 B.Th.U. basis.

The amount of coke required to give this extra thermal yield is equivalent to 57 lbs. per ton of coal carbonized; in other words, the amount of coke available for sale is reduced (in round figures) by ½ cwt. per ton of coal.

Adding the Producer Gas.

The gas flows as required from the relief holder through a Kent shunt type meter, which normally deals very satisfactorily with crude producer or water gas, into the foul main immediately prior to the exhauster. The producer gas is regulated to flow into the coal gas stream at a constant rate, the mixed gases then passing on through the washing and purifying plant to the holders.

No troubles have ever been experienced with stratification.

We are thus able to send out a gas having a quality seldom varying more than from 5-10 B.Th.U. as a maximum, either side of the datum line of 500, and a constant composition and specific gravity, even when working in and out of the same holder with standpipes side by side.

The gas entering the holder varies over a range of about 50 B.Th.U.—*i.e.*, 25 B.Th.U. either side of datum.

By using one or other of the mechanical systems of controlling the rate of flow of the producer gas, it should be possible, in many cases, to put a gas of nearly constant calorific value into the holder, as when working under proper conditions the calorific value of the straight gas never drops below standard, so that there would always be some diluent entering the coal gas stream.

Whether or not there would be any increase in the percentage of producer gas that it would be possible to admit, with mechanical control against hand control, to maintain the same mixed gas standard, is problematical.

Conclusions.

While the admixture of producer gas, as a diluent to coal gas, presented alluring prospects from the financial point of view, some apprehension was felt as to the possible effect on flame temperatures and consequently appliance efficiencies, because of the rather high inert content of the mixed gas. No difficulties whatever have been experienced in this direction at Hertford.

It is necessary to consider the effect on the capacity of the mains of the somewhat high specific gravity of the coal/producer gas mixture. Comparing the specific gravity of the mixture (0·575) with that of a coal gas, diluted to 500 B.Th.U. by the addition of, say, blue water gas and giving a specific gravity of the order of 0·5, the reduction in the gas delivering capacity of the distributing mains, assuming all other features, pressures, &c., are the same under either conditions, will be in the region of 7 p.ct.—a factor which cannot altogether be ignored.

It should be remembered, however, that the above assumption is based on the fact that straight coal gas is being properly diluted with water gas, whereas there is no doubt that there are a large number of works where dilution is being obtained by "overpulling" or the addition of air, either of which methods may conceivably result in a higher specific gravity than that of a coal/producer gas mixture.

Whatever plant is used to manufacture producer gas an external producer, in some form or another, is to be preferred to drawing the gas required from internal producers. In the former case, complete control can be maintained to obtain the quality and quantity of gas required for dilution, in the latter case the requirements of the settings fed by the producer must be taken into consideration.

Even in small works, no difficulty should be found in fixing up a small outside producer, worked under suction provided by the exhauster or preferably under pressure by a simple steam injector.

By using producer gas instead of the exhauster to control the quality of the gas the following are some of the many advantages:

(*a*) Better retort house working conditions.
(*b*) Higher thermal yield (net coal gas) per ton of coal and higher throughput per retort consequent on (*a*).
(*c*) Maintenance charge of retorts lower.
(*d*) Complete control of calorific value of gas made.
(*e*) Lower cost of gross gas.

No difficulties have as yet appeared in connection with the purification of the mixture of coal gas and producer gas; in fact, we are of the opinion that the purifying plant works more efficiently under the present conditions, no doubt due to the H_2S content being more constant. Usually the H_2S content of the mixture, at the purifier inlet, approximates 500 grains per 100 c.ft. Under conditions of "pull" in the retorts one is almost certain to obtain a higher and at least fluctuating H_2S content.

One drawback has definitely been found—that, under these conditions, naphthalene is more difficult to remove, and that even a small quantity will cause trouble.

At Hertford, gas has been oil-washed for the removal of naphthalene for some years, and we have been able to maintain the content between *nil* and a maximum of 2 grains per 100 c.ft. with ease.

Since the introduction of producer gas as a diluent, only with difficulty has the naphthalene content been maintained at a troublefree figure. During the summer months it was found necessary, on occasion, to spray paraffin into the mains to alleviate trouble from this source. This trouble is presumably due to the proportional smaller unsaturated hydrocarbon content of the gas, to act as a carrier for the naphthalene.

Taking average results for the past twelve months, after allowing for coke used to heat settings and manufacture of producer gas, there is 11·4 cwt. of coke + breeze per ton of coal carbonized available for sale and for steam raising purposes. The thermal yield per ton of coal carbonized is (71 therms of coal gas + 6 therms producer gas) giving a total of 77 therms.

Where water gas is being used as a diluent for straight coal gas it might conceivably be to advantage, both from a working and particularly commercial point of view, to substitute producer gas in whole or part and make a better quality water gas. This is an aspect beyond the scope of this paper, and one that depends entirely on local conditions.

Discussion.

The President, opening the discussion, said he was interested that Mr. Deas found it economical to make a straight coal gas of a calorific value of 650 B.Th.U. Most of them did not find it advantageous to make it as high as this; in fact, it almost looked as if Hertford could do with a little "pull" in the retorts. He did not know how they obtained a specific gravity of 0·45. The author's remarks on the utilizing of breeze as a fuel were particularly interesting, and he referred to the statement that the fines had a tendency to run to the centre of the producer, forming an unburnt core from which gas could not be made. On the other hand, apparently they took no precautions to distribute the charge in the bed. He would also like to know if the anti-dip device was of any material value, as they were using pressure in the settings.

Mr. Deas, replying to the point raised in regard to the quality of the gas, referred to the fact that their make at Hertford was 71 therms per ton, using stop-end retorts, which was fairly good practice. The specific gravity was calculated, and he had not been able to get this exactly in the case of the coal gas. In regard to the question of breeze, they did mix it well, and it ran all right for about a day, but then worked to the centre again. The anti-dips were certainly useful in isolating retorts; by lowering the moveable sleeve one could

completely isolate any one retort, and steadier pressure conditions were also obtainable.

Mr. R. SUMMERSON (Luton) remarked that Mr. Deas had dismissed the use of waste gas rather summarily. It seemed to him, however, from the figures given that had he diluted with waste gas he would have more coke for sale. If he used waste gas for diluting at 18 p.ct. CO_2 and a specific gravity of 1·07 he would require 23 p.ct. of it to make a 500 B.Th.U. gas, and the specific gravity of the mixture would then be 0·592 as against the present 0·575 with producer gas dilution—which was nearly as good. Mr. Deas mentioned, he concluded, that the motive in adding producer gas was because the cheap therms so obtained were valuable. It seemed to Mr. Summerson, however, that he would make more profit by selling the extra coke.

Mr. DEAS, with reference to Mr. Summerson's suggestion that the therms were worth more in the form of coke than in the form of gas, said that the point to be noted was that if they did not use producer gas, but diluted with, say, waste gas, each therm would cost 3·85d., which was the cost of coal gas on the same basis as producer gas. By substituting seven of the coal gas therms—*i.e.*, 7 p.ct.—with producer gas at 1·55d. per therm, on the other hand, there was a saving of 1s. 4d., against which must, of course, be debited the return for the coke used for making the producer gas, and under these conditions released for sale, and which would have a value of 10d. There was thus a net saving on 100 therms of the mixed gas of 6d. or 0·06d. per therm, giving 0·30d. per 1000 c.ft. On top of this there was the advantage of the overall increase in thermal output of the retort bench due to the addition of the producer gas therms. The whole question as to economic value depended entirely on the comparative costs of coal gas therms, producer gas therms, and the market value of the coke used for manufacturing producer gas—and these figures would naturally vary with local conditions.

A POINT OF ECONOMY.

Mr. H. C. SIMS (South Metropolitan Gas Company) asked if any fall in the working economy of the retorts had been noticed since the introduction of the dilution system. He also asked whether it was not necessary to alter the rate of flow of the producer gas.

Mr. DEAS repeated that they obtained 71 therms per ton of coal which did not indicate any fall in economy. They only had 8-hour charges, and they were limited to small charges on account of the fact that they had to leave room to draw the charge out, the retorts being stop-ends. They found no necessity to alter the rate of flow of the producer gas except as explained in the paper; they could set it in the first instance according to the amount of coal gas made and keep it at a constant rate always. They found that they were able to maintain the calorific value within variations of 5 to 10 B.Th.U. of the standard.

Mr. E. R. WILLIS (Gas Light and Coke Company) referred to the matter of steam decomposition and also to fuel depth in the generator.

Mr. DEAS stated that the generator only required refuelling every 4 to 5 hours, and at its lowest point—*i.e.*, just before refuelling—there was 4 to 5 ft. of fire. With regard to steam decomposition, no actual work had been done in this direction, but a glance at tests B and C would indicate that the percentage decomposition was quite good. Very little water was pumped from the syphons.

Mr. MCCASKGILL (Tonbridge) said that in adding an inert gas Mr. Deas was increasing the capital charges on his retort house. He suggested that as there was a blue water gas plant at the works this gas should be used according to the current price of coke. It would be interesting to know the price he could give for coke in order to make blue water gas rather than producer gas. He also remarked that producer gas was rather "shaky" stuff.

Mr. DEAS replied that the producer gas was quite a good gas. In regard to the question of price, he presumed that Mr. McCaskgill meant what price they would have to buy the coke at in order to make water gas. This would work out at about 22s. per ton—much lower than the price at which it could be bought. Referring to the question of adding capital charges to the retort house, Mr. Deas said the water gas plant at Hertford was only used in an emergency, and the capital charges were going on whether the plant was in use or not.

Mr. C. F. PETERSON (East Grinstead) remarked that it would be rather interesting in this connection to know the difference in the prices of coal and coke as affecting the working.

Mr. DEAS said that it was rather difficult to mention prices, as these differed from those obtaining in the London Area. Their own coal price, however, worked out at about 30s. per ton into the retorts, and coke realized about 27s. per ton net.

EFFECT ON DOMESTIC BURNERS.

Mr. F. C. SMITH (Gas Light and Coke Company) remarked that he had had no practical experience of the subject under discussion, but the point of the effect of this change of gas on the ordinary domestic burner occurred to him. He would like to know whether they had to send the fitters round at Hertford to adjust the gas appliances when they started to send the gas out. He also inquired if they had any photometer tests to show whether at low and high pressures the gas composition remained unchanged.

Mr. DEAS doubted whether the change would be noticeable in the ordinary domestic burners; no difficulties had been experienced at Hertford when the change over was made. He thought there were many cases where the specific gravity was the same as that at Hertford. Their figure was now constant, and once the burner was set it would be all right.

Mr. C. W. M. ROGERS (Gas Light and Coke Company) remarked that the combustion chamber temperature was stated to be 1400° C. He asked what the retort temperature was, suggesting that it should be at least 1100° C., in which case the scurf would be very heavy. If the retort temperature was lower, was it due to some means of shielding in the setting? He also inquired how much air was used in the purifiers. Mr. Rogers said he was further interested in the excellent coal Hertford seemed to have; the ash in their coke was only 5 p.ct., whereas if this figure was obtained for the ash in coal it was considered very good.

Mr. DEAS, in reply, stated that their retort temperatures were not much more than 1050° C. They had a very high throughput which tended to keep the temperature down. They ran a somewhat higher volatile in the coke, making this sacrifice in order to keep the quality of the coke up. They used screened coke which was fork-handled to the plant, and thus the ash content of the coke used in the tests did not directly indicate the ash content of the coal used. In reply to the question of air in the purifiers, sufficient was added to maintain the mixed gas at 0·8 p.ct. oxygen content at the purifiers. In regard to the low ash content of the coke, it should further be mentioned that the coal utilized was all washed, and came from the best of the South Yorkshire seams. Regarding scurf formation, this was not found to be excessive, each retort being scurfed once in six weeks to a timetable, and it was usually possible to remove the whole of the scurf in about eight hours. Further to the suggestion that waste gas should be given more consideration, Mr. Deas said in conclusion that it should be remembered that if waste gas was utilized as a diluent the inert content of the final mixed gas was going to rise very considerably, particularly the CO_2, which would be somewhere in the region of 4·7 p.ct.

Midland Junior Gas Association

AUTOMATIC CONTROL OF CALORIFIC VALUE OF COAL GAS

By W. R. TILDESLEY, of Tamworth.

[Extract from a Paper before the Association at Birmingham, Dec. 10]

The automatic control apparatus at Tamworth is the subject-matter of Patent No. 356425, and in order to follow the working of same it would perhaps assist to put before you the way in which it was originally devised.

A steam engine driven exhauster is governed by an ordinary hydraulic governor, the calorific value of the gas being controlled by the speed of the exhauster. A small tap is screwed into the top of the hydraulic bell; the speed of the exhauster may now be controlled by opening and closing this tap controlling the vacuum in the bell, instead of altering the weighting of the bell.

Suppose it were possible to connect the pen arm of the recorder (which is on the make) by means of a piece of cord to this tap, so that when the calorific value of the gas was above 500 the tap would open, and immediately the calorific value dropped below 500 the tap closed, we should then be able to control the speed of the exhauster according to the calorific value of the gas made, at the same time controlling the calorific value by overpulling.

Now if this hydraulic bell, instead of opening and closing the throttle valve of the exhauster, were connected through a series of levers to a butterfly valve fixed in a pipe connected to inlet of exhauster at one end and open to the atmosphere at the other end, we should then have the recording instrument controlling the amount of diluting medium admitted to the inlet of exhauster, thus controlling the calorific value.

The apparatus consists of a controlling valve operated by means of the pen arm of the recorder; this valve is connected by means of tubing to a tee-piece, one outlet of which is connected to the equilibrium pipe of an ordinary hydraulic bell and the other through a valve (called the

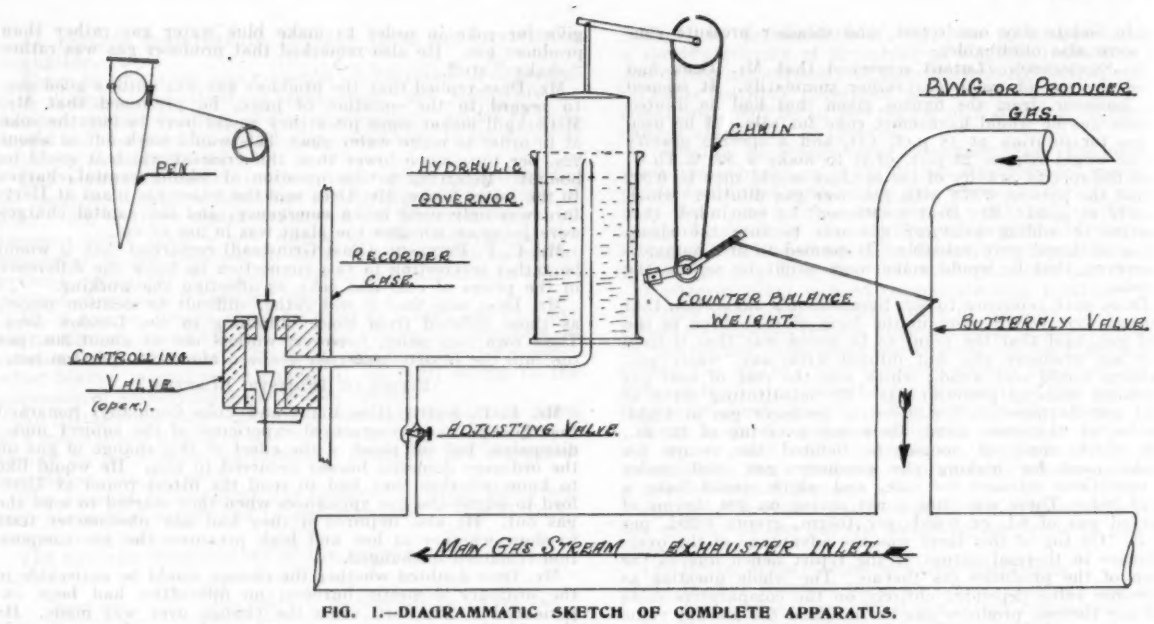

FIG. 1.—DIAGRAMMATIC SKETCH OF COMPLETE APPARATUS.

adjusting valve) to exhauster inlet. The vacuum at exhauster inlet is maintained constant by a separate hydraulic bell controlling the exhauster. The lever arm of the hydraulic bell is connected through a system of levers

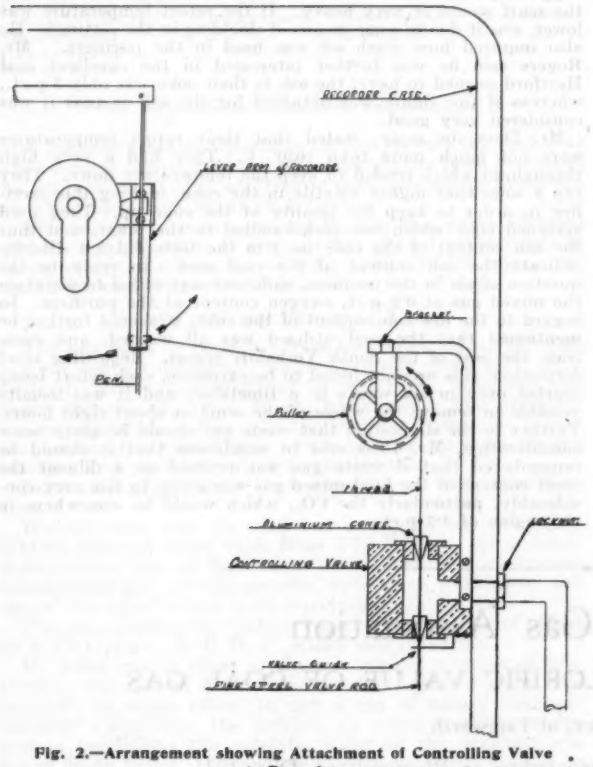

Fig. 2.—Arrangement showing Attachment of Controlling Valve to Recorder.

to a butterfly valve which controls the amount of diluting medium admitted. The recording instrument is supplied with gas at the outlet of the exhauster, and immediately the calorific value exceeds 500 the controlling valve opens, breaking the vacuum in the hydraulic bell, causing it to rise and at the same time opening the butterfly valve.

Conversely, when the calorific value drops below the 500 line the controlling valve closes, restoring the vacuum in the bell of the hydraulic governor, the bell falls and closes the butterfly valve cutting off the supply of diluting medium. The adjusting valve is a small ¼-in. valve, capable of fine adjustment. In practice this is opened just enough to pull the bell down when the controlling valve is shut. The counterbalance weight is necessary so that the bell may take up any position according to the calorific value of the gas; for instance, the balance weight may be so adjusted that when the gas is 525 the diluting valve is half open, and fully open at 550. The higher the position of the hydraulic bell the greater is the turning moment of the balance weight about its axis.

The Controlling Valve.

The moving portion of this valve weighs 2 grammes, and is supported by means of a thread which is attached to the pen arm of the recording instrument. It consists of two inverted aluminium cones mounted on a rod. These cones open and close the apertures at top and bottom of the fixed portion controlling the quantity of air admitted to the bell. This construction ensures that the valve has no effect whatever on the pen arm.

Fig. 3 shows the complete apparatus. Gas is supplied to the recorder by a ¼-in. pipe from the exhauster outlet. The gas is purified by means of a small purifier made of 3-in. pipe 12 in. long filled with two layers of purifying material —wet sawdust at the bottom to remove tar fog, and a layer of oxide on top. At the outlet of these purifiers the

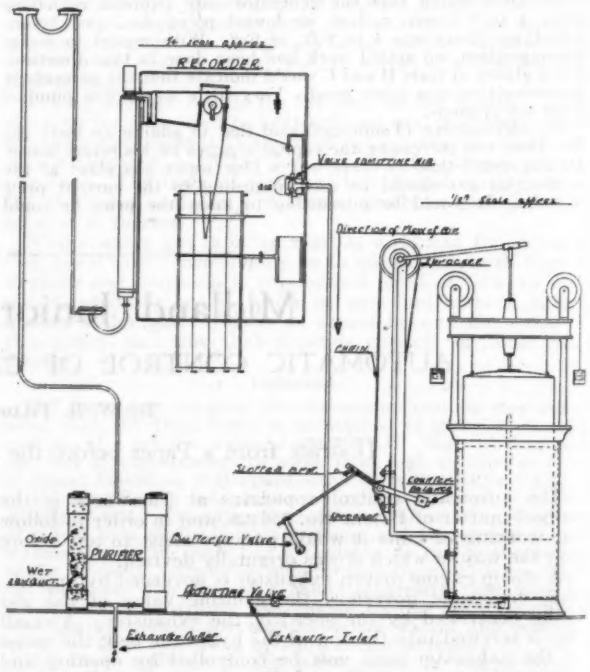

Fig. 3.

gas is passed through a plug of cotton wool to eliminate final traces of tar fog. A stand-by is provided. The details of this purifier were kindly supplied by Mr. Shaw, of Buxton.

The time lag from point of dilution to flame of recorder

is 4½ minutes; therefore the lag on the purifiers is much less. From the purifier the gas is led to a recording instrument. A tee-piece is inserted so that the instrument may be supplied with town gas. The controlling valve (valve admitting air) is fixed to side of recorder case by 2 × ⅞ in. screws, and a ⅜-in. tap is fixed in the pipe connecting the valve to the tee-piece inserted in the equilibrium pipe of the bell. This pipe is ⅜-in. compo. The sprockets are keyed to spindles; the top sprocket has 44 teeth and the bottom 18 teeth; the spindles run in ball bearings. The tension on the chain is adjusted by altering position of the bottom bracket, which is movable. The bell is 12 in. in diameter, and is capable of moving vertically 6 in.

The butterfly valve is on the end of a 2-in. pipe connected to the inlet to the exhauster. The degree of opening of the butterfly valve may be varied by altering the positions of the pivot in the slotted arm and in the butterfly valve arm.

The following are analyses of two spot samples of gas, one at inlet condensers and the other on the town, the diluting medium being air:

—	Town Gas.	Crude Gas.
	P.Ct.	P.Ct.
CO_2	1·2	1·2
C_nH_m	2·6	4·0
O_2	3·6	1·2
CO	4·6*	4·8†
CH_4	26·4	32·2
H_2	43·3	52·1
N_2 (by difference), 14 p.ct. air.	18·3	4·5

* Calorific value, 500. † Calorific value, 632 (estimated).

Before the installation of this apparatus at Tamworth, the calorific value of the gas was entirely in the hands of the leading stokers, who altered the weighting of the hydraulic governor controlling the exhauster according to the calorific value of the gas, as shown by the recording calorimeter on the outlet of the purifiers. Now the lubrication of the exhausters is their only duty, and the responsibility of maintaining a constant calorific value is in the hands of the management. Provided the calorific value of the gas leaving the retort house is above 500, the quality of the gas leaving the works is within 2 p.ct. of the declared calorific value.

Discussion.

The PRESIDENT (Mr. W. L. S. Spinks) commented upon the thoroughness with which Mr. Tildesley had prepared his contribution. It was somewhat different from the usual run of papers read before the Society, and was specially welcome because it had relation to the solution of problems experienced on small gas-works.

Mr. F. A. JENKINS (Leamington) congratulated Mr. Tildesley upon the short time-lag he obtained with his appliance. Mr. Jenkins said he would like to know the means, if any, for testing the quality of the gas; also whether there were any variations in specific gravity, because the latter did not always correspond with the calorific value.

Mr. S. K. HAWTHORN (Birmingham), who seconded the motion, inquired what precaution Mr. Tildesley took to see that the recorder was not disturbed. As to dilution, it appeared to be very considerable, especially in the winter and with short periods of charging.

Mr. R. ASHWORTH (Tamworth) said the work described by Mr. Tildesley had been in operation at Tamworth for some months, and he could say, from an economic point of view, that it paid handsomely. The working results were much better than previously. The apparatus had been invaluable because it kept "a straight line" on the town. The system helped, moreover, the sequence of charging. Practically speaking, there were no stopped pipes.

Mr. J. H. DUIGNAN (Kidderminster) inquired if it were not possible to reduce the time lag; also whether trouble was caused by deposits on the valves. It seemed to him that, if anything happened to the recorder and the C.V. dropped materially there should be some means of giving an alarm to the stokers.

Mr. E. T. PICKERING (Birmingham) asked what was the amount of attention necessary to keep the purifier in working order.

Mr. J. H. WAINWRIGHT (Halesowen) referred to the question of the mixing properties in gasholders. He wondered if Mr. Tildesley found any difficulty in this respect through the gas crossing over from the one side of the holder to the other side more quickly than anticipated.

Mr. F. A. C. PYKETT (Coventry) inquired if Mr. Tildesley knew precisely the amount of air that was admitted.

Mr. F. J. BENGOUGH (Birmingham) asked for further information as to the effect on specific gravity, and how it was recorded.

Mr. TILDESLEY, in replying to the discussion, said they had no means of determining the quality of the gas except by analysis. Neither had they a meter for measuring the quantity of air admitted. To satisfy themselves that the recording instruments were accurate they checked the recording calorimeter on the town every other day. Every morning the instrument on "the make" was set by means of the instrument on the town. They had not been able to reduce the time lag, but he supposed it might be decreased by bleeding the gas. They had, however, only a small purifier. They were troubled by sticky deposits on the valves, and those were removed by benzene without difficulty. This cleaning operation took about half-an-hour, and for that period the apparatus was shut off. Any rise in C.V. on the town could be equalized. There would be no difficulty in rigging up an electric bell as a warning to the stokers if a material fall in C.V. occurred. As to the mixing of the gas, he found that this was done better in a small holder than a large holder; he attributed this to more movement in the former. They had not diluted with producer gas, though they had not lost sight of that. He thought specific gravity would be more constant with air than with blue water gas or producer gas. As to a question as to whether corrosion of mains took place owing to dilution with air, Mr. Tildesley pointed out that at Tamworth they had a paraffin vaporizer, this having been originally installed to enrich the gas with benzene on the gas leaving the works. It consisted of a cylinder containing tubes, which were heated externally by means of a steam jacket. High-pressure gas was passed through them, paraffin being allowed to drip on them at the same time. Thus the stream of high-pressure gas carried the vaporized paraffin to the inlet holder. There was a film of oil on the water in the holders, and a film of oil was deposited on all mains and services, thus preventing corrosion. The apparatus also effectively dealt with the deposition of naphthalene. They had no means of recording specific gravity.

The Salerni System of Low-Temperature Carbonization

By R. V. WHEELER, Professor of Fuel Technology, Sheffield University.

[A Paper read at the Third International Conference on Bituminous Coal at Pittsburg, U.S.A., November, 1931]

The fundamental shortcomings of low-temperature carbonization are:

(1) That the density of the coke is not usually high enough to qualify it as a satisfactory substitute for bituminous coal for general purposes.
(2) That no commercial plant has yet been devised and installed which can be held to be entirely free from mechanical troubles due to expansions and distortions of materials as a result of prolonged heating.

This paper describes a system, devised by Piero Salerni, in which these defects are remedied.

The system is a variation of a low-temperature carbonization process with which the Department of Fuel Technology, Sheffield University, has been experimenting during the past four years, as being that which presented the highest thermal efficiency and yielded true primary oils of the best quality and semi-coke of the highest density attained by any process.

Without impairing the thermal efficiency or the character of the products yielded by the original system, Salerni has succeeded in increasing the density of the semi-coke so materially (by 25 to 30 p.ct.) that it can be accepted as a satisfactory substitute for bituminous coal for general purposes. The calorific value of the coke is also increased, while the process incidentally removes the causes of trouble heretofore experienced in the refining of low-temperature oils. Mechanical difficulties of plant have also been overcome. Instead of attempting to prevent expansions and distortions of the materials of construction, an almost impossible task having regard to the temperatures involved, Salerni has so designed his plant that unavoidable expansions and distortions do not affect its proper working.

The Salerni retort is of the rotary-drum type. Friction, regarded as unavoidable in retorts of this kind, due to the necessity of providing gas-tight joints between moving parts, has been eliminated, no two faces which move relatively to one another being in contact. Yet the plant is gas-tight. This remarkable result has been achieved by resorting, for the purpose of making gas-tight seals, to simple physical instead of mechanical means. Flexibility of operation is another outstanding characteristic of the

Salerni system. Its operation can readily be varied in such a manner as to make any given installation capable of treating any caking coal available. By suitable blending with caking coals, non-caking coals can also be satisfactorily treated.

The plant is of simple design, and is capable of construction in units of large output; for example, a retort 14 ft. in diameter and 225 ft. in length, standard dimensions for cement-kiln operation, would have an output of 1000 tons of raw coal per 24 hours. The capital outlay which its installation would involve should, therefore, be low. Labour charges should also be small, since the operation of the plant is automatic, supervision only being needed.

The Salerni system is based upon well-established principles, and does not comprise any feature which has not proved satisfactory in practice on an industrial scale over a prolonged period. It therefore provides a solution of the problem of low-temperature carbonization so complete as to render the treatment of all bituminous coal for use on grates economically practicable.

Major Difficulties of Low-Temperature Carbonization.

As compared with the high-temperature carbonization in coke ovens and gas retorts, two major difficulties present themselves when the temperature of carbonization desired must not exceed, say, 450° C.

The first difficulty is that of heat transmission. Coal being a bad conductor of heat, the problem of the rapid transference of heat to the charge, when the temperature gradient is low, is perforce a difficult one. On the rapidity of heat transference depends the economic factor of throughput of the plant.

The second important problem with respect to the low-temperature carbonization of coal arises from the agglutinating and swelling properties that many bituminous coals possess in a high degree, which may cause the sticking of the charge of coke to the walls of the retort, whether the retort be static or rotary.

This partial fusion and swelling occurs, with most bituminous coals that exhibit it, over the temperature range 300° to 400° C., when the coal becomes pasty and coke formation begins. Over this temperature range, some coals intumesce, so that the volume occupied by their cokes is considerably enhanced and the coke is, in consequence, of low density. As the temperature is increased up to, say, 600° C., a slight shrinkage may occur, but not sufficient materially to affect the ease of discharge of the coke from a static retort.

The Salerni System.

In the Salerni system, the swelling properties of the coals are controlled by the better of the two approved methods—namely, by blending with a non-coking material, finely ground semi-coke breeze from the process itself. The absolute density of the semi-coke being high, its admixture has the effect of increasing the density of the finished product. Moreover, the proportion of coke powder which it is necessary to add, to obtain coke of the requisite density, can be determined without regard to the caking properties of the particular coal with which it is blended, because of the introduction into the blend of another cementing material—namely, low-temperature oil (from which the lighter fractions have been distilled), to ensure the requisite degree of cohesion of the charge.

Inasmuch as the materials used in the blend consist of oil and ground breeze from the process itself, they are always available, and they can be added in any proportion required without danger of lack of cohesion in the ultimate product. The Salerni system thus has that flexibility of operation which a system must possess to be capable of general application.

Although at first sight it might appear that, by passing some of the products of carbonization through the retort a second time, the throughput of raw coal for the plant is reduced, this is not so, because the admixture of coke powder and oil so increasing the conductivity of the charge for heat that the throughput is not materially affected. Moreover, neither the coke powder nor the oil are allowed to cool below 250° C. before re-introduction into the retort.

Advantages of the Salerni system, other than those already mentioned, are that, inasmuch as all the breeze formed is utilized in the process itself, only coke of useful shape and size is produced for the market; while owing to the redistillation of the heavier fractions of the oil, the yield of lighter fractions is increased, the pitchy fractions, with which it is normally difficult to deal in refining stills, being left in the coke.

The Plant.

The plant consists of a simple continuous rotary furnace, completely enclosed in an outer casing, the base of which rests within a groove providing a hydraulic seal.

An important feature of design is that the rotary furnace is open-ended and no stationary parts are in contact with the ends. The charge is introduced into the furnace by gravity, a spiral scoop, integral with the furnace, serving to prevent building up or escape of material. The charge travels along the furnace by gravity, under the rotation of the furnace, and the finished product is delivered, also by gravity, to a chute.

The furnace, slightly inclined, rests on rollers and is driven by gearing in the usual manner. It is heated by hot flue gases from a separate combustion chamber, injected at the discharge and into a distributing head, integral with the furnace, by an annular nozzle on a self-aligning duct member. The construction of this duct member is such that there are three separate, concentric, gas ducts. The central duct serves to exhaust from the furnace the useful gases and vapours of distillation through a circular aperture in the distributing head with which it registers (without contact with it), and from which a tubular extension, integral with the furnace, projects and serves to canalize the gases and keep them from contact with that part of the furnace having cooled walls. The intermediate annular duct serves to inject into the distributing head the heating gas, and the outer annular duct serves to inject the cooling gas.

The self-aligning duct member rests about its centre of gravity on a standard in a spherical seating, through which the three separate ducts, for distillation gas, heating gas, and cooling gas respectively, communicate with corresponding passages in the standard, the heating gas and the cooling gas being led through separate annular chambers, and the distillation gas being exhausted through a passage in the centre of the standard.

The heating gas is led by radial ducts on the distributing head to an annular chamber which extends over the whole length of the furnace, the inner wall being the heating surface through which heat is imparted, by conduction, to the charge, in counterflow, so that the heating-gas issues into the casing, from peripheral apertures at the charging end of the furnace, at a temperature nearly equal to that at which the charge is introduced and is exhausted from the casing partly through an outlet from which it is circulated to the cooling-gas injector, and partly through the conveyor casing. The steam and waste-gases given off during the initial heating of the charge are also exhausted here.

The cooling-gas delivered by the injector enters, through an annular receiving cone, a jacket formed around the distributing head and extending over the first portion of the heating chamber, so as to constitute a cool wall by contact with which the sensible heat of the finished coke is recovered to a certain extent before its discharge, a portion of the cooling-gas passing direct from the distributing head to a chamber which enshrouds the heating-gas chamber over the first half of its length.

By suitable regulation of the exhaust suction in the distillation gas-duct and in the flue-gas outlets, useful gases and vapours are prevented from mixing with the flue gases and steam, which are led to atmosphere. It is thus a remarkable feature of the plant that the gases and vapours are introduced, canalized, and exhausted, without leakage and without intermixing, by the simple regulation of their respective velocities and pressures, not a single mechanical seal being used.

The coke, after being cooled to some extent by contact with the wall of the cooling-gas jacket, is discharged through a chute on to a screen, the breeze passing to a coke grinder and the lumps being delivered to a measuring balance tray working in combination with a time gear, to ensure that a sufficient percentage of the lump coke is added to the breeze delivered to the grinder to provide the requisite percentage of coke powder in the charge. The remaining lump coke is tripped over on to a coke discharge conveyor which takes it to atmosphere through a passage where the flue-gases and steam exhausted through the conveyor casing are made to pass before being discharged to atmosphere. These gases provide a seal against the penetration of air into the compartment in which the coke is screened and ground and the blend made and conveyed to the furnace.

The outstanding feature of the plant is that nowhere are there two parts of it in contact, the faces of which move relatively to one another. The unavoidable expansions and distortions of plant of this character cannot, therefore, affect its efficient working. The mechanical difficulties, which the external application of heat direct to rotary retorts introduces, necessitating the use of thick plates (because at the temperatures involved, about 500° C., steel loses nearly four-fifths of its mechanical strength), are entirely removed by the device of causing a flow of cool gases around the shell. This, incidentally, side distribution of heat throughout the system, prevents local overheating, and renders the use of solid, and heavy, heat-insulation material on the outer casing unnecessary.

Apart from the mechanical strength secured by the main-

tenance of the outer shell of the retort at a low temperature, an additional high degree of mechanical strength is provided by the compound nature of the structures. Retorts of considerably larger diameter, and higher output, than have hitherto been economically possible can therefore be used, the total weight of the plant per ton of material treated being greatly reduced.

The Process.

The essence of the Salerni process is the blending with the coal to be treated of a fairly high percentage of semi-coke, from the process itself, ground to pass a 60-mesh (I.M.M. standard) sieve,* and of the heavier fractions of the low-temperature oil.

The blending of coke breeze with coal to improve the quality of metallurgical coke is well known in coke-oven practice. The action of the added coke particles appears to be as centres of contraction from which shrinkage takes place uniformly, with the result that the apparent density of the product is increased because of the elimination of "major cracks." It is obvious, however, that the addition of coke in the form of porous granules cannot affect appreciably the real density of the ultimate product because the density of the granules is no greater than that of the coke eventually formed. In the Salerni system the coke is ground to such a degree of fineness that its apparent density coincides with its real density. A heavy material, the density of which is unaffected by heating, is thus blended with the charge, and the average density of the product is increased proportionately with the amount of coke powder in the charge.

The addition to the charge of the pitchy fractions of the oil from the process is necessary because, to produce a fuel of the density required for general purposes, such a high percentage of coke powder has to be added that the blend may lose the quality of agglomeration required to ensure cohesion in the coke. With some coals, the agglutinating properties of which are unusually high (as, for example, those of the Kent coalfield in England), it is conceivable that a dense and coherent coke would be obtained without the use of oil, but the addition of oil presents other advantages which make its introduction into the blend desirable. The main object of low-temperature carbonization being to produce a free-burning smokeless fuel of as high calorific value as possible, so that it can be used on all grates as a substitute for bituminous coal, it is desirable to leave in the coke as high a percentage of "volatile matter" as is economically practicable. By the addition of the heavy oil, the pitchy constituents, which are of small, if any, market value, remain in the coke and increase its volatile-matter content. Moreover, the heavier-oil fractions are to a certain extent "cracked" during redistillation, and the yield of lighter oils is thus increased.

The blending of heavy oil with the charge in the Salerni system thus provides an economic method of utilizing the pitchy fractions which hitherto have not been put to useful purpose. The addition of oil to the plant has yet another advantage, that of increasing the conductivity of the charge, for the oil ensures good contact between the coal and coke particles. The addition of coke in the proportions used in the system, 25 to 30 p.ct., or more, dependent on the swelling properties of the coal, itself has the effect of nearly doubling the conductivity of the charge. A further advantage which the admixture of the oil presents is the complete elimination of dust within the retort. The dust nuisance, as is well known, is not easily dealt with in low-temperature carbonization, because a comparatively small drop in the temperature at which the vapours are withdrawn results in the formation of mist, particles of the heavy-oil fractions condensing and remaining in suspension in the gases, with the result that they condense in and choke the de-dusting apparatus.

It is hard to over-estimate this advantage, for the absence of an efficient method of de-dusting has been one of the reasons why the treatment of low-temperature oils in ordinary refining apparatus has been so difficult in the past. Thus, the Salerni system not only remedies the two fundamental shortcomings which have rendered uneconomical in the past the production of a dense semi-coke by the low-temperature carbonization of bituminous coal, but provides a solution to some of the troubles connected with the treatment and utilization of the oils.

To summarize, the advantages of the Salerni system are:

(1) All caking bituminous coals, including such highly fusible ones as the Kent coals, can be treated without any alteration to the plant and without necessitating the blending of coals of different origins.
(2) Subject to suitable blending with caking coals, non-caking coals can also be treated.
(3) The coke produced is of an apparent density between 0·85 and 0·95 and sometimes exceeding the latter figure.
(4) The coke is in the form of spheroidal lumps of suitable size, easy to handle and transport without fracture, breeze being eliminated.
(5) The oils to be refined are rich in the lighter fractions and are free from dust and pitchy constituents.
(6) The thermal efficiency of the process is high.
(7) The design of the plant disposes of all the mechanical troubles generally encountered in low-temperature carbonization.
(8) Leakage of gas and vapours from the plant is impossible.
(9) The construction of the plant is simple and cheap and permits of its manufacture in units of large output.
(10) The operation of the plant is entirely automatic and does not involve regulation to find limits.

On these counts, it is difficult not to conclude that by the Salerni system the admittedly difficult problem of low-temperature carbonization of bituminous coals has been effectively solved.

Recent developments in the design of the Salerni plant have resulted in the incorporation of the combustion chamber within the drum itself so that only cold gases are delivered by the self-aligning injector duct. In consequence of this change it has been possible to arrange a circulation of cold gases and air within the outer annular insulating space in such manner as to return to the heating chamber that quantity of heat which was previously allowed to reach the drum shell. The latter being thus maintained at atmospheric temperature, the gas-tight casing outside the furnace needs no longer to carry heat insulation lagging, and can, therefore, consist of a plain corrugated sheet structure.

* All the pores of the coke are broken up when it is of this degree of fineness.

Dry Gas Meter Design

By J. H. Bingham, M.I.Mech.E., M.I.Chem.E., &c., of Messrs. George Glover & Co., Ltd., Ranelagh Works, Chelsea

[Extract of a Paper at a Meeting of the Yorkshire Junior Gas Association in Bradford, Dec. 12]

During the last twenty years interest in the gas meter has been growing, until to-day there is the need, even if not the demand, for education in gas meter design and practice. It was the introduction of gas fires, cookers, and other gas consuming appliances that caused attention to be centred in the meter itself. A larger instrument than the lights type was necessary, and an investigation resulted in the introduction of the Standards type meter. It was readily agreed that in the old lights type meter full use had not been made of the interior space. An enlargement of the valve ports, the provision of larger measuring chambers, and the assembling with more capacious passages and gasways resulted in an increase in output varying from 30 to 60 p.ct. of the original output of the lights meters taken size for size. For a while, but only for a while, did this increased capacity satisfy the demand. The question was asked, "Has the limit been reached?" "Is it not possible to get still more through the meter without impairing its accuracy and without increasing its over-all dimensions?" The output per hour of a meter is the product of the output per revolution and the number of revolutions per hour. Could either of these factors be increased? In the transition from lights to Standards the former factor only had been altered. It was found that the capacity of the measuring chambers could be still further enlarged, if not in the diametral dimension then in the length of operating stroke. Coupled with this increase a higher speed of working resulted in a much augmented output per hour. Further modifications in valve port areas and chamber sections were necessary to obtain full benefit from the increases in the primary factors. A more suitable name than High Capacity for the re-designed meters could not be found. Generally speaking the basic meter—*i.e.*, the lights type—has been reconstructed to work at any-

thing from 25 to 50 p.ct. increase on its original speed, and has been provided with measuring chambers of twice the original capacity.

Surprising is the ignorance of gas companies' officials on the subject of gas meters. Surprising too is the reluctance of numerous gas engineers to move with the times. There are many who still pin their faith in the lights meters, although, as the designation implies, they were intended for measuring the gas consumed for lighting only. Others there are who, while demanding a better performance from the meter, insist on the retention of the lights name, qualified by some such phrase as "double capacity." All this leads to difficulty and confusion from the manufacturer's standpoint. The multiplicity of types and designations impedes the work of standardization and maintains production costs on a comparatively high level. From each of the early lights types of meters a corresponding Standard meter was produced; and, in turn, from each of these has been evolved a high-capacity meter also. Within the range from 2-light to 10-light there were originally four sizes of meter—namely, 2-light, 3-light, 5-light, and 10-light. These four sizes had as their badged outputs 12, 18, 30 and 60 c.ft. per hour respectively, the badged capacity in each case being the product of the number of lights and 6 c.ft. per hour. In the four sizes of cases now are produced twelve denominations of meter, four lights type, four Standards, and four high-capacity, with badged outputs ranging from 12 to 250 c.ft. per hour. Surely there is not the need for so many variations? Each development or advance has multiplied the number of types to be produced. Had there been a universal abandonment of each old type in favour of its successor, production would have been simplified. Even now there is a tendency to exert still further the modern high-capacity meter.

In designating a 5-light size cased meter as a 120 c.ft. per hour high-capacity, one has already a guaranteed output equal to four times the badged capacity of the original 5-light. Is not this sufficient? If not, then what is to be the factor of safety? Were it possible to obtain uniformity of construction and conditions throughout a batch of meters in similar sized cases, such meters might have as their badged capacity the available output within the statutory loss of 5-tenths. This is impracticable, as the maximum outputs of the various meters of a batch, although similarly constructed, would vary. So also would there be variation among the different makes of meters. Hence it is necessary to fix upon some capacity less than that obtainable within the 5-tenths pressure loss, and common to all makes of meter.

There appears to be the tendency nowadays to compare meters on a maximum output basis, and this is forcing competition among the makers with maximum output as the objective. It must be remembered that the maker has to give a five-year guarantee with his meters. Even when this applied to the old lights type meters there were no stipulations as to the manner or conditions in which they should be worked. Is the same to be expected of the high-capacity?

The practice of speaking of maximum output is to be deprecated very strongly. Instead of maximum capacity I suggest the use of "safe working load." Any guarantee given by the maker should be conditional on the meter not being worked beyond that load. How to limit the working of a meter to that load or how to check it is a difficult problem for the meter maker. The maker is entirely in the hands of the user. The easiest way and the fairest way to both the meter manufacturer and the gas undertaking is obviously to install a meter of ample capacity. The safe working load of a meter should never be less than the peak load when all the appliances in the service are in full use. If the meter maker is to give a guarantee of performance and durability, it is incumbent on the user to reciprocate by giving a guarantee not to work the meter beyond the safe working load.

It is obvious that when the five-year guarantee was extended to the high capacity, the user was benefiting to an appreciable extent. Assume for purposes of comparison that a 5-light meter had a total output of 100,000 c.ft. in five years, and that the initial cost of the meter was, say, £2 10s., then the meter cost per 1000 c.ft. would be 6d. This assumes too that the meter has scrap value only at the end of the period. Under the same conditions of guarantee a 120 c.ft. high-capacity meter working an equivalent number of hours as the 5-light and at the same relative average load, would be expected to give a total output of 400,000 c.ft. Taking the initial cost of the high-capacity the same as the lights type (although the cost of the former is slightly higher), the meter cost per 1000 c.ft. of gas measured would be only 1½d.

I think it is only fair to suggest that it is time the question of reciprocal guarantees was considered, for at present, as previously stated, there is no restriction on the rate of working, neither is there any control over the type of gas with which the meter is called upon to function.

A gas meter is a delicate instrument and susceptible to rough handling and ill-usage, and it is incumbent on all concerned to see that those who handle meters should treat them with the care and respect which they merit.

(To be concluded.)

Metropolitan Gas Bills for 1932.

Summary of the Main Provisions.

Commercial Gas Company.

This Bill has for its main object to confer further powers in respect to the issue and management of capital. It provides that all future issues of ordinary or preference stock may, with the approval of the Board of Trade, be offered to gas consumers and employees of the Company. The price of the first issue of preference stock shall be determined by the Chairman of the London Stock Exchange. The price of ordinary stock and subsequent issues of preference stock shall be as near as may be to the average market price of such stock for the two weeks preceding the issue. Any stock not so issued or taken up shall be offered for sale by public auction or tender. Any stock still unsold may be offered at the reserve price to existing stockholders, employees, or consumers; or, finally, may be disposed of at the best price obtainable as the Directors may determine. These provisions do not apply to stock issued for the co-partnership scheme, or under the agreement with the South Metropolitan Gas Company, or in substitution for redeemable preference stock. Such stock must, however, be issued as near as may be to the average price of the last two weeks preceding issue. The Company may purchase and cancel ordinary stock at a price not more than 5 p.ct. above the middle price of the current official quotation, or may exchange 5 p.ct. debenture stock for ordinary stock at par value. The aggregate amount so purchased or exchanged shall not exceed £350,000 nominal value. As from the date when the Company first exercise this power to purchase or exchange stock the higher rate of dividend (6 p.ct.) provided in the Act of 1927 shall cease to apply. Power is sought to appoint an additional Director possessing professional, technical, commercial, financial, or scientific knowledge.

[Parliamentary Agents: Messrs. Sherwood & Co.]

Gas Light and Coke Company.

The objects are to extend the Company's limits of supply, to authorize the execution of works and the acquisition of lands, and to permit the payment of interim dividends. The Company's limits of supply are extended to include the Urban District of Canvey Island, in the County of Essex. Power is given to lay pipes under, along, or across any river or watercourse in or adjoining Canvey Island. The Island is to be a differential price area within the terms of Part III. of the Act of 1931, and the maximum price of gas is to be 1s. 4d. per therm. Certain specified lands are to be acquired and used for the manufacture of gas and residual products. Provision is made for the construction of two wharves or landing-stages in the River Thames at Canvey Island, each with a connecting jetty. Power is sought to acquire the lands necessary for these works and certain additional lands. There is provision for the payment of half-yearly dividends without the sanction of a general meeting.

[Parliamentary Agents: Messrs. Dyson, Bell, & Co.]

South Metropolitan Gas Company.

Power is asked by the Company to issue additional capital in ordinary or preference stock to the amount of £1,000,000, which shall rank as part of the general capital, with equal rights and privileges. Preference stock may carry any rate of interest as the Directors may determine. Any future issue of stock may be offered (1) to consumers and employees at average market price of the two weeks preceding the offer; (2) to existing stockholders by auction or tender with a reserve price; (3) to existing stockholders, employees, or consumers, at the reserve price; or, finally, (4) for the best price obtainable, as the Directors may determine. These provisions do not apply to co-partnership stock, or stock issued under any agreement approved by the Board of Trade.

The Company are empowered to acquire and hold the shares of, or to lend money to, any company or local authority engaged in the manufacture, distribution, or sale of gas or residual products, or in connection with which residual products are utilized; or in connection with the production or distribution of coal, coke, oil, or products arising therefrom, or dealing in appliances or materials connected with the manufacture, distribution, or use of gas. The aggregate amount so invested shall not exceed one-tenth of the Company's issued capital, and shall not exceed (except with the approval of the Board of Trade) one-twentieth of such capital in the case of any one company or local authority. The Company are authorized to enter into agreements for amalgamation, purchase, leasing, or joint working (including the carrying on of research) with other authorized gas undertakers.

[Parliamentary Agents: Messrs. Sherwood & Co.]

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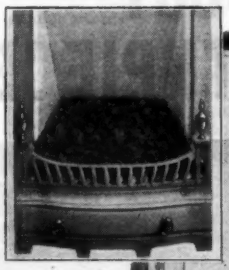
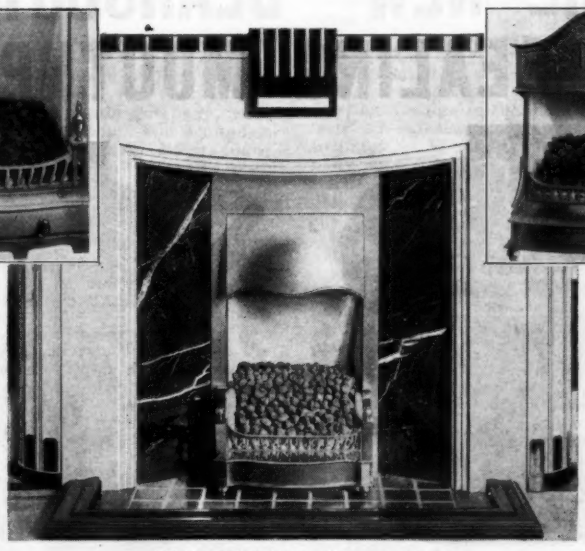
"ST. NICHOLAS," 1909



"FIRE QUEEN," 1916



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Bath Gas Special Order

An application for a Special Order, under the Gas Undertakings Acts of 1920 and 1929, was the subject of inquiry at the Board of Trade Offices, Westminster, on Thursday, Dec. 17, by Mr. J. F. RONCA (Director of Gas Administration).

At the opening of the inquiry, Mr. W. E. TYLDESLEY JONES, K.C. (leading Counsel for the Bath Gas Company), expressed on behalf of all present, and of those members of the Bar who had the privilege of appearing at such inquiries from time to time, their great pleasure that Mr. Ronca had recovered from his recent serious illness, and assured him that they had felt the greatest sympathy. Counsel also commented upon the patience and kindness they had received at his hands, which was very greatly appreciated.

Mr. RONCA was very much touched by Counsel's words, and expressed his thanks feelingly.

The Bath Gas Special Order was deposited as far back as March, 1930, but there has been considerable delay. It provides for the transfer of the undertakings of the Chippenham Gas Company and the Corsham Gas Company, Ltd., to the Bath Gas Company by agreement, and for the further extension of the Bath Company's area of supply by the inclusion of a number of parishes which are not at present within the area of any gas undertaking. The position at the inquiry was that there was no opposition, but the Bath Corporation and the Chippenham and Corsham Companies were represented, being in a position somewhat analogous to that of petitioners against alterations. The main arguments arose concerning the proposal to apply the basic price principle, with different basic prices in different parts of the area. Mr. Ronca, therefore, not having the assistance of an opposition, had many questions to put in the course of the proceedings, in order to test the arguments put forward.

The Bath Gas Company was represented by Mr. W. E. Tyldesley Jones, K.C., and Mr. H. R. Askew as Counsel, with Mr. George Evetts as Consulting Engineer. Mr. S. G. Turner, K.C., represents the Bath Corporation, the Consulting Engineer on this side being Mr. Arthur Valon (of Messrs. W. A. Valon & Son, Westminster). Mr. R. C. Dodds represented the Chippenham and Corsham Gas Companies.

Mr. W. E. TYLDESLEY JONES said that the Order made provision for the application of the basic price system, with the usual co-partnership benefits. The Bath Company was supplying gas in the City of Bath and surrounding districts. It was a maximum price and dividend Company, and its consolidated ordinary capital was a 5 p.ct. stock, which 5 p.ct., he added, was very safely secured. The Company was entitled to charge up to 12d. per therm within the inner part of its existing area, and 16·2d. elsewhere. The actual charge in the inner area was 5½d. per therm; in various parts of the outer area there were three different prices—6·2d., 7·2d., and 8·1d. respectively. He was informed that the prices charged in the Bath area were the lowest in the United Kingdom.

The Corsham Company is a maximum price and dividend Company, supplying in the parish of Corsham and other parishes in the Rural District of Chippenham. The maximum price is 15·4d. per therm, and the actual price 12·23d.

The Chippenham Company is a sliding-scale Company, with powers to supply in the Borough of Chippenham and a number of parishes in the Rural District of Chippenham. Its standard price is 15d. in the inner area, and 16·2d. in the outer part of the area. The actual price charged in the inner area is 10·59d., but the Company is not supplying in the outer part of the area.

The area which it is proposed to add to the limits of supply of the amalgamated Company covers parishes in the Rural Districts of Chippenham and Bradford-on-Avon.

The proposed amalgamations, said Counsel, were in pursuance of two agreements dated Dec. 31, 1929, but there had been delays due to a combination of circumstances. Ordinary and preference stock of the Bath Company were to be given to the holders of Chippenham and Corsham stocks in proportions set out in the agreements. A question would arise as to the terms of compensation to Directors and Officers of the Chippenham and Corsham Companies.

Mr. R. C. DODDS (for the Chippenham and Corsham Companies) said he was supporting the terms of the agreements, which were reasonable, and should be given effect to.

Mr. TYLDESLEY JONES said that the real matter to be discussed at the inquiry was that of the application of the basic price system, and it was asked that the area of supply of the amalgamated Company should be divided into seven different districts, each having a different basic price. The basic prices as deposited in the draft Order were arrived at by adding 0·75d. per therm to the prices actually charged in the Bath areas, and rounding off the existing prices in the other areas. The Bath City Council, however, had objected to the proposed basic prices in the Bath areas, and after discussions with the Corporation's expert it was agreed that the 0·75d. should not be added. Therefore, the proposed basic prices in those areas were, in the Bath inner area (City and County Borough of Bath and part of the Rural District of Bath), 5·5d. per therm; Bath outer area, 6·2d.; Keynsham area, 7·2d.; and Colerne and Wraxall area, 8·1d. In the Chippenham inner area (Borough of Chippenham) the existing price is 10·59d., and the proposed basic price was rounded off to 10·5d.; in the Chippenham outer area there was no present supply, and the proposed basic price was 11·6d.; and in the Corsham area the existing price of 12·23d. was rounded off to give a basic price of 12·25d.

Counsel pointed out that the Bath Company had made the agreement with the Corporation concerning the basic prices in the Bath areas, relying on the application of multiple basic prices. In the view of the Company, the basic price of 5·5d. per therm agreed upon in respect of the inner area was lower than it ought to be if that area were considered alone, and if there were no hope of the Company being able to apply its energies and experience in the future to the development of the outside districts. The price charged in the inner area had been reduced to 5·5d. undoubtedly through the energy and industry, experience and good management, expended by the Company. That had been expended entirely for the benefit of the consumers, because for a very long time past the shareholders had obtained no advantage by way of additional dividends.

The basic price principle, continued Counsel, had been applied in a number of cases, and the principle of multiple basic prices had been applied. He emphasized that Section 7 (C) of the Gas Undertakings Act of 1929 constituted an authority to the Board of Trade to accept any principle—it was not binding, of course—which Parliament had accepted and incorporated in Acts. Thus, the Board of Trade occupied a very important position in this matter.

Coming to the question as to whether the principle of multiple basic prices should be applied in the Bath area, he said that if one charge were to be made throughout the whole area an average would have to be arrived at; as the outer parts of the area were developed, there would be an advantage which would inure to the benefit of the shareholders. One price throughout the whole of the area of supply would not be reasonable, because of the disparity between the costs of supplying the different parts of the area, owing to the nature of those various parts. In his view that circumstance, which justified the differential prices, justified multiple basic prices.

Counsel emphasized strongly that if in fact the Board of Trade took the view that multiple basic prices were not to be allowed, the result must be to retard further amalgamations of this kind—though he did not say they would stop. It was less desirable that the effect of amalgamations should be attained in a manner such as he had suggested than that amalgamations should be carried out with the sanction of the Board of Trade, the Board having more complete control in the interests of the public.

Counsel said that if there were to be a single basic price covering the whole area of the amalgamated Company, then the Company would be deprived of any benefit resulting from the energy displayed in the development of the outer areas, because increased dividends would depend on price reduction in the inner areas as well.

In the course of argument, Mr. Ronca said that a gas company might be getting a proper return for its development efforts, but it was important to ensure that the consumers in the outer area should not pay more than they ought to pay in relation to those in the inner area. Counsel replied that if there were no inducement to reduce the differential, that was likely to happen. It was to the benefit of the public that the Company should have the strongest inducement to reduce the differentials in the outer areas, so long as they were not thereby doing injustice to the consumers in the inner areas. Of course, the Company must be trusted to deal with their consumers fairly, and it did not wish to reduce the differentials in the outer areas to the detriment of consumers in Bath.

Mr. *A. W. White*, F.C.A., F.S.A.A. (Partner in Messrs. Cash, Stone, & Co., Chartered Accountants), giving evidence in support of the promoters, recalled that recently, in the case of Dudley, a single basic price was imposed, and he recounted an experience to show that this was having repercussions in other areas. His experience of amalgamations of gas companies was that, generally speaking, the greater advantage inured to the outside districts, but that had not been detrimental to the inner districts; undoubtedly amalgamation was an advantage from the public point of view.

If a holding company were formed to acquire the shares of the Bath and Chippenham Companies it could achieve the same results as regards increased dividend as would be achieved by the amalgamated Bath Company with multiple basic prices, and the holding Company would not be subject to control by the Board of Trade. Further, if the separate Bath and Chippenham Companies applied for basic prices, those basic prices would be fixed according to the conditions in the two areas. If the Bath, Chippenham, and Corsham Companies were amalgamated as proposed, they would have a common capital, and he agreed that separate basic prices would not involve the earmarking of capital to separate areas. Identities would inevitably be lost; separation of the capital could be done only on an arbitrary basis, which would be falsified as the different areas developed. Commenting on the inducement to reduce the differentials in the outside areas if there were separate basic prices, he said that, if the Company reduced prices to the extent of (say) £2000 in Chippenham and Corsham, this would represent a considerable reduction in pence per therm if spread over the Chippenham and Corsham areas, and that reduction of price might

induce quite an increase in consumption. But if the £2000 were spread over Chippenham, Corsham, and Bath, then the Chippenham consumers would get only about £100 of it; the decrease of price would be probably infinitesimal, and there would be very little increase of consumption. He pointed out that consumption in Bath averaged about 70,000 c.ft. per consumer per annum; it was very much lower in Chippenham, and the Company looked to effecting an increase in the consumption per consumer there as well as an increase in the number of consumers.

Mr. RONCA said it seemed that the basic price for Bath had been so cut down that the capital was equivalent to a 5 p.ct. maximum capital. In the outer area, however, prices had been fixed presumably to give something more than 7 p.ct. He asked whether, if arrangements were made as proposed in the Order, they would be equivalent to giving a return of something more than 5 p.ct. all over.

Mr. *White* replied in the negative, and said the basic prices proposed were such as would give 5 p.ct. to the Chippenham and Corsham shareholders, on the purchase prices agreed upon.

Mr. RONCA said that was based on existing consumptions, and suggested that there was a very much better prospect of increasing consumption per consumer outside than inside Bath, and that consumption would in effect be taken into account in calculating a differential.

Mr. *White* agreed that there was a better prospect of increasing consumption per consumer in the outer districts than in Bath, and that consumption would be taken into account in calculating the differential. He added that a large company could do more than a small company, and if the large company in fact did more, then it had created a consumers' benefit.

Mr. RONCA said he knew of no cases in which a sliding-scale company had had different standard prices in different parts of an area, differing by the amount of the differential; usually it had the one standard price and a differential for outside areas.

Mr. *White* expressed the view that this was one of the defects of the sliding-scale system.

Mr. RONCA asked if that were not equally a defect in the basic price system except within the last few years.

Mr. *White* said the principle of multiple basic prices was conceded in the cases of Swansea and Cardiff in 1921, and Windsor in 1922. The precedents were about 8 to 3 in favour of multiple basic prices, he believed.

Mr. RONCA asked why this difficulty had not been raised in connection with sliding-scale companies.

Mr. *White* suggested that it might have been because the method of computing the dividends payable was different in sliding-scale companies, and there would have been difficulty.

Mr. TYLDESLEY JONES pointed out that if there were separate standard prices there must be separate capitals, because the sliding-scale operated on a percentage of capital.

Mr. DODDS, on behalf of the Chippenham and Corsham Companies, said he had been handed a document indicating how the Board of Trade might alter the conditions in the agreements. He was concerned with the fact that if the agreements were altered as indicated there, compensation would be paid only in respect of Directors and Officers holding office on the day of completion of the transfer, whereas originally it was provided that it should be paid to those in office at the date of the agreements, Dec. 31, 1929.

Mr. *White* said he supposed the idea of the Board of Trade was that compensation should not be paid in respect of Directors who might have died or had been thrown out by the shareholders.

After further discussion of the compensation conditions,

Mr. *Geo. Evetts* (Consulting Engineer to the Bath Company) gave evidence. He presented a table indicating the costs of supplying gas to Chippenham and Corsham, and said that the Company would not be able to effect any reduction of price in either of the two areas within the first year or two after amalgamation; after linking up and supplying gas from Bath, the cost of supplying in those areas would be practically the same as it was to-day, on present consumption. The Company had to develop the areas before it could effect reductions of prices, and the basic prices asked for were justified.

In drawing a parallel between the sliding-scale and the basic price, he said it was often suggested that the differential in a sliding-scale company did not affect the dividend. In his view that was a weakness, because in certain cases it might result in outside districts not getting a square deal, but having the differential maintained. If that were a weakness in that case, it was a weakness to have a single basic price in an area such as that of the proposed amalgamated Company at Bath.

The Bath Company and its works, he continued, were extremely efficient. He had taken from Field's Analysis figures relating to the three London companies and all the provincial companies which could be compared with Bath, and on all vital matters the Bath Company was equal or superior to the others. He believed the Bath figure representing the capital expended per million c.ft. of gas sold was the lowest given in Field's Analysis.

In reply to questions by Mr. Ronca, he estimated that the cost per therm of supplying the outer districts would drop after the first year; it would depend largely on the facility with which consumers' premises could be fitted, and the length of time required to establish showrooms and canvass, coupled with some small incentive in the way of price reduction. The sale per consumer in Corsham could be substantially increased, and he would not be surprised to find that in Chippenham it could be doubled in five years; at one place some miles from the centre of Bath there was a consumption of 60,000 c.ft. per ordinary consumer per annum, and 30,000 per prepayment consumer.

Mr. S. G. TURNER, K.C. (for the Bath Corporation), addressed Mr. Ronca in support of the proposals. He pointed out that the Corporation represented the consumers in Bath, and that there was no representative of the consumers in the outer areas present to dissent, although he was told that they had had competent advice. Counsel also put forward arguments in favour of the application of the multiple basic price principle.

Mr. *Arthur Valon* (of Messrs. W. A. Valon & Son, Consulting Engineers), who has advised the Bath Corporation, then gave evidence, and expressed the view that one got into far more difficulty by trying to fix one basic price and then to adjust for excess prices than by having multiple basic prices. Further, multiple basic prices were fair. If there were one basic price there was a definite interest in maintaining the differential at the maximum. If, with multiple prices, the Company could reduce the cost of supply to the outer areas by £1000, they could reduce the price thereby £750 and divide £250 among shareholders and co-partners. If, with a single basic price, the cost of supply to the outer areas were reduced by £1000, and this was applied to reducing the differential in the outer areas as it should be, the shareholders would get no advantage; but if it were applied to reducing the price in the inner area, then they would get the £250. Much had been said as to the excellence of the Bath Company, but he did not think any ordinary Board of Directors would reduce the differential and get nothing if by reducing another price they could get the £250. He had worked out that, assuming the consumption in the outside areas remained the same and the differentials were halved by reduced costs, then the advantage that could be gained by way of dividend would be only £849, or 4s. 11d. p.ct. If, however, they could not reduce the differential until consumption increased, it must be remembered that that increased consumption could not be attained without increased capital outlay, and he considered it doubtful that the Company could extend the works and mains to increase the consumption at much less proportional cost than the present cost per million. Thus, if they trebled the output in the outside districts and reduced the differentials by half, the capital outlay on the outer districts would be increased proportionately. The 4s. 11d. p.ct. was the utmost they would get.

Mr. DODDS, addressing Mr. Ronca with regard to the compensation clauses in the agreements, asked that they should remain as they were originally. He pointed out that, whereas the original agreement provided that certain sums should be divided between the Directors of the Companies as they should decide, the suggested amendment by the Board of Trade was that each Director should receive seven times the amount he received during 1928. Mr. Dodds held that the former was the better course, because they could divide the money as their services to the Companies justified. As to Auditors, the agreement originally had provided for five years' fees, but the proposed amendment was three times the 1928 fees. He recalled Mr. White's view that the fees paid were small, and that was a good reason for paying five years' fees. Finally, he urged that compensation should be paid to Directors and Officers in office at the date of agreement.

In reply to Mr. Ronca, he agreed that it would be more satisfactory to provide for payment to Directors in office at the date of the inquiry instead of at the date of completion of the transfer. Mr. Ronca said he would consider that.

The inquiry then closed.

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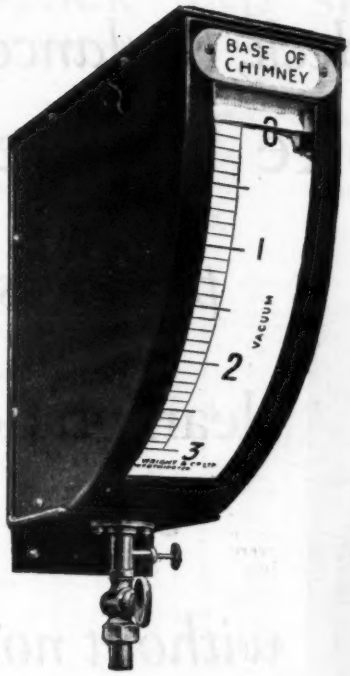
[For Market Reports, see p. 790.]



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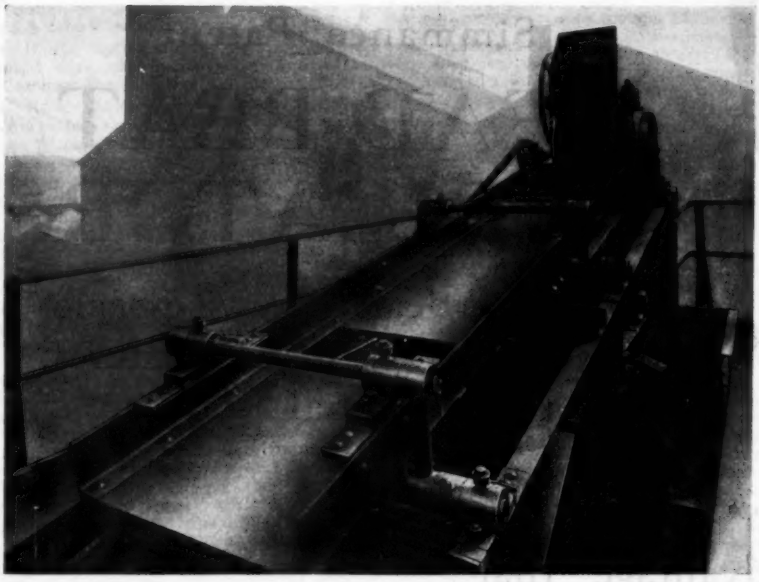

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STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Dec. 19. (Provincial Exchanges Dec. 18.)	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
1,551,868	Stk.	Oct. 5	7⅞	7⅞	Alliance & Dublin Ord. ...	100—105	...	104½—105
374,000	,,	July 9	4	4	Do. 4 p.c. Deb. ...	67—72	...	...
522,655	,,	Aug. 24	7	7	Barnet Ord. 7 p.c.	120—125	...	...
300,000	1	Oct. 19	1/9⅜	1/4⅛	Bombay, Ltd.	15/—17/6	...	...
174,500	10	Aug. 10	9	9	Bournemouth 5 p.c. ...	14⅜—15⅜	...	15—15¼
500,050	10	,,	7	7	Do. B 7 p.c. ...	12—13	...	12¼
439,160	10	,,	6	6	Do. Pref. 6 p.c. ...	10½—11½	...	...
50,000	Stk.	Dec. 14	3	3	Do. 3 p.c. Deb. ...	53—58[a]	—2	...
162,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	73—78[b]	—2	...
357,900	,,	Aug. 24	7½	7½	Brighton & Hove 6 p.c. Con.	114—119	...	115
371,880	,,	,,	6⅔	6⅔	Do. 5 p.c. Con.	104—107	...	105—106⅔
1,287,500	,,	July 23	5	5	Bristol 5 p.c. max.	88—90[a]	...	...
120,420	,,	June 25	4	4	Do. 1st 4 p.c. Deb. ...	78—80[a]	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	78—80[a]	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	98½—99½[a]	...	...
885,000	,,	Oct. 5	8	7	British Ord.	108—113	...	110½—111
100,000	,,	June 25	7	7	Do. 7 p.c. Pref.	110—115	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	70—75	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	92—97	...	...
160,000	,,	June 25	5	5	Cambridge 5 p.c. Deb. ...	92—97	...	...
100,000	10	Nov. 30	8	6	Cape Town, Ltd.	8⅞—9⅜[a]	...	...
100,000	10	Oct. 30	4½	4½	Do. 4½ p.c. Pref. ...	6¼—7¼	...	6¼—6⅜
150,000	Stk.	June 25	4½	4½	Do. 4½ p.c. Deb. ...	65—70	...	...
626,860	,,	July 23	6	6	Cardiff Con. Ord.	95—98	...	97
237,860	,,	June 25	—	2⅜	Do. 5 p.c. Red. Deb.	90—95	...	...
157,150	,,	Aug. 10	6½	5	Chester 5 p.c. Ord.	86—91[b]	...	...
98,936	1	Oct. 5	1/-	2/-	Colombo, Ltd. Ord.... ...	27/—32/-	...	...
24,500	1	,,	1/4¼	1/4¼	Do. 7 p.c. Pref.	17/—19/-	...	...
609,204	1	Oct. 19	1/3'27	-/10'90	Colonial Gas Assn. Ltd. Ord.	10/—15/-	...	11/-
296,053	1	,,	1/5'67	1/2'54	Do. 8 p.c. Pref.	10/—15/-	...	...
2,078,280	Stk.	July 23	6	6	Commercial Ord.	92—95	...	92—92½
475,000	,,	Dec. 14	3	3	Do. 3 p.c. Deb. ...	51—56[a]	—1	52
787,560	,,	Aug. 10	7	7	Croydon sliding scale ...	107—110	...	107—108
453,100	,,	,,	5	5	Do. max. div.	81—84	...	82½—84
542,270	,,	Aug. 24	10	7	Derby Con.	120—125[c]	...	...
55,000	,,	June 25	4	4	Do. Deb.	65—70[c]	...	...
209,000	,,	Sept. 7	5	5	East Hull Ord. 5 p.c. ...	71—76	...	...
1,002,180	,,	Sept. 21	16½	14	European, Ltd.	98—108	—2	100—101½
18,958,033	,,	July 23	5⅞	5⅞	Gas Light & Coke 4 p.c. Ord.	17/6—18/6[f]	...	17/9—18/3
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.... ...	53—58	—1	53⅜—57
4,294,691	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	70—75	...	70—71½
5,694,095	,,	Dec. 14	3	3	Do. 3 p.c. Con. Deb. ...	52—57[a]	—1	54—56
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	93—98[a]	—2	94—96
2,500,000	,,	,,	—	4½	Do. 4½ p.c. Red. Deb. ...	85—90[a]	—1	85—89½
161,480	,,	Sept. 7	10	10	Harrogate Cons. 10 p.c. max.	157—162	...	...
82,500	,,	Aug. 24	7	7	Hastings & St. L. 5 p.c. Conv.	95—100	...	...
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	80—85	...	...
70,000	10	9 Oct. '30	⅛	10	Hongkong & China, Ltd. ...	12—13	—¼	12⅛—12½
213,200	Stk.	Aug. 10	6	6	Hornsey Con. 3½ p.c. ...	89—92	...	89½—90
2,800,000	,,	Oct. 30	25	15	Imperial Continental Cap.	310—330	...	312—320
223,180	,,	Aug. 10	3½	3½	Do. 3½ p.c. Red. Deb.	70—75	...	70
235,242	,,	Aug. 10	8½	8½	Lea Bridge 5 p.c. Ord. ...	129—132	...	...
2,145,907	,,	Aug. 24	6	6	Liverpool 5 p.c. Ord. ...	96½—97½[b]	—¼	...
306,083	,,	July 15	4	4	Do. 4 p.c. Deb. ...	79—81[b]	...	...
165,736	,,	Aug. 24	9	8	Maidstone 5 p.c. Cap. ...	123—128	...	...
63,480	,,	June 25	3	3	Do. 3 p.c. Deb. ...	55—60	...	...
75,000	5	Nov. 30	110	110	Malta & Mediterranean ...	6½—7[c]	...	...
392,000	—	Oct. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	78—83	...	...
171,978	Stk.	Aug. 24	5	5	M. S. D. Utility "C." Cons.	76—81	...	...
522,992	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	67—72	...	...
675,000	,,	May 21	16	16	Montevideo, Ltd.	70—80	...	...
2,061,315	,,	Aug. 10	5⅔	5	Newcastle & Gateshead Con.	15/9—16/9[d/]	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	68—70[d]	...	...
691,705	,,	June 25	3½	3½	Do. 3½ p.c. Deb. ...	69—71[d]	...	...
277,285	,,	Oct. 30	5	5	Do. 5 p.c. Red. Deb.	96—98[d]	...	...
199,940	,,	Aug. 24	7½	7½	North Middlesex 6 p.c. Con.	105—110	...	...
396,160	,,	Aug. 10	5	5	Northampton 5 p.c. max. ...	74—79	...	...
300,000	,,	Nov. 30	7	9	Oriental, Ltd.	88—98[a]	...	...
69,000	5	13 May, '15	—	—	Ottoman	0—¼	...	...
205,162	Stk.	June 25	8	8	Plym'th & Stonehouse 5 p.c.	110—115	...	...
424,416	,,	Aug. 24	8	8	Portsm'th Con. Stk. 4 p.c. Std.	119—124	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	76—79	...	...
686,312	,,	July 23	4	4	Primitiva 4 p.c. Rd. Db. 1911	83—86	...	85—85½
389,813	,,	June 25	4	4	Do. 4 p.c. Cons. Deb.	84—87	...	86—86½
150,000	10	Sept. 21	6	6	San Paulo 6 p.c. Pref. ...	7½—8	...	...
1,736,968	Stk.	Sept. 7	6½	6	Sheffield Cons.	103—105[e]	...	...
95,000	,,	July 9	4	4	Do. 4 p.c. Deb.	79—81[e]	...	...
133,201	,,	Sept. 7	5	8½	Shrewsbury 5 p.c. Ord. ...	85—90	+3	...
90,000	10	June 11	15	15	South African	3½—5½	...	...
6,709,895	Stk.	July 23	7½	5	South Met. Ord.	96—99	—1	97—98
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	103—108	...	...
1,895,445	,,	July 9	3	3	Do. 3 p.c. Deb. ...	53—58	...	...
1,000,000	,,	July 23	4	5	Do. 5 p.c. Red. Deb.	93—99	...	95⅞—96½
91,500	,,	Aug. 10	8½	8½	South Shields Con.	108—110[d]	...	...
1,543,795	,,	Aug. 10	6½	6½	South Suburban Ord. 5 p.c.	101—104	...	103
668,837	,,	June 25	5	5	Do. 5 p.c. Deb.	92—97	...	...
647,740	,,	Aug. 24	5	5	Southampt'n Ord. 5 p.c. max.	76—79	...	...
121,275	,,	June 25	4	4	Do. 4 p.c. Deb.	70—75	...	...
250,000	,,	Aug. 24	7	7	Swansea 7 p.c. Red. Pref. ...	96—99	...	...
200,000	,,	June 25	6½	6½	Do. 6½ p.c. Red. Deb.	99—102	...	...
1,076,490	,,	Aug. 10	6⅔	6⅔	Tottenham and District Ord.	103—107	...	...
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	93—98	...	...
199,005	,,	Dec. 14	4	4	Do. 4 p.c. Deb.	68—73[a]	—2	...
85,701	,,	Sept. 21	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	72—77	...	...
310,694	,,	Aug. 24	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	100—105	...	...
88,380	,,	,,	5	5	Do. 5 p.c. Pref. ...	85—90	...	...
1,322,220	,,	July 9	7	7	Wandsworth and District: Consolidated	111—114	...	...
971,378	,,	,,	5	5	Do. 5 p.c. Pref.	90—95	...	...
1,167,964	,,	June 25	5	5	Do. 5 p.c. Deb.	94—99	...	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. * Ex. div. Paid free of income-tax. ‡ For year. § Div. = 10 p.ct. p.a. less tax and less tax on interim dividend.

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GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see earlier page.]

Business on the Stock Exchange was on a very small scale last week. The liquidation which had been so prevalent during the past few weeks eased up a little, but there were few buyers, so that prices in most sections continued to depreciate. In fact, many quotations at the present time are at that tempting low level when purchases might with advantage be made by those investors who can afford to wait until better times, which it is hoped are not too far distant.

The same remark also applies to Gas stocks and shares. Several of the larger ordinary issues which are usually available now stand at comparatively low prices, and, subject to the rates of dividend being at least maintained for the current year, a purchase at the present time is worth consideration for income purposes alone, apart from any possibility of capital appreciation. Among these can be cited the Commercial at 93½ (yielding, on the 1930 dividend, £6 8s. 4d.), Gas Light £1 units at 18s. (yielding £6 4s. 5d.), South Metropolitan at 97½ (yielding £6 8s. 2d.), and Tottenham at 105 (yielding £6 6s. 2d.).

There were few changes in the quotations last week apart from a batch of debentures which were marked down for the usual half-yearly interest payments. The only improvement was in Shrewsbury 5 p.ct., which rose a further 3 points to 87½, making a total appreciation of 13 points in the past two weeks. Among those to record falls, South Metropolitan ordinary dropped another point to 97½, and fractional losses took place in Hong Kong £10 shares and Liverpool ordinary (at Liverpool). In a few cases, however, business was recorded at prices slightly above last week's best, but not sufficiently high to affect the quotations.

Current Sales of Gas Products.

The London Market for Tar and Tar Products.

LONDON, *Dec.* 21.

The values of tar products are as follows:

Pitch is from 70s. to 75s. per ton f.o.b.

Creosote, for export, varies from 3¾d. to 5d. per gallon f.o.b., according to specification.

Pure toluole is firm at about 2s. 7d. to 2s. 8d. per gallon; pure benzole is 1s. 8d. to 1s. 9d. per gallon; 95/160 solvent naphtha, about 1s. 6d. per gallon; and 90/140 pyridine bases, about 4s. per gallon.

Tar Products in the Provinces.

Dec. 21.

The average prices of gas-works products during the week were: Gas-works tar, 22s. to 26s. Pitch—East Coast, 55s. to 56s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 55s. to 56s. f.o.b.* Toluole, naked, North, 1s. 8d. to 1s. 8½d. Coal-tar crude naphtha, in bulk, North, 5d. to 5¼d. Solvent naphtha, naked, North, 1s. 3d. to 1s. 3½d. Heavy naphtha, North, 11d. to 11¼d. Creosote, *ex* works, in bulk, North, liquid and salty, 3¼d. to 3½d.; low gravity, 1¼d.; Scotland, 3¼d. to 3½d. Heavy oils, in bulk, North, 5d. to 5½d. Carbolic acid, 60's, 1s. 6½d. to 1s. 7d. Naphthalene, £9 to £10. Salts, 50s. to 70s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Dec.* 18.

Orders are gradually falling away, probably on account of the approaching holidays. Meantime quotations remain fairly steady.

Pitch.—Home value is not under 60s. to 62s. 6d. per ton *ex* works in bulk, and export value is nominal at 60s. per ton f.o.b. Glasgow.

Refined tar to Ministry of Transport Specification is in remarkably good call for the time of the year, and quotations are from 4d. to 4½d. per gallon f.o.r. in buyers' barrels, according to delivery.

Creosote oil.—Production is low, and quotations are steady. B.E.S.A. Specification is 2¾d. to 3d. per gallon; low gravity, 3½d. to 3¾d. per gallon; and neutral oil, 3¼d. to 3½d. per gallon—all f.o.r. makers' works in bulk.

Cresylic.—Stocks are increasing, and orders are scarce. Meantime values are easy. Pale, 97/99 p.ct., 1s. 2¾d. to 1s. 3¼d. per gallon; dark 97/99 p.ct., 1s. 1½d. to 1s. 2¼d. per gallon; and pale, 99/100 p.ct., 1s. 4¼d. to 1s. 5d. per gallon—all f.o.r.

Crude naphtha.—Available supplies command 4½d. to 5d. per gallon, according to quality and district.

Solvent naphtha.—No change can be reported, there being plentiful supplies on hand. 90/160 grade is 1s. 3d. to 1s. 4d. per gallon, and 90/190 grade 1s. to 1s. 1d. per gallon.

Motor benzole.—Value is easy at 1s. 3d. to 1s. 4d. per gallon f.o.r. makers' works in bulk.

Pyridines.—90/160 grade is 3s. to 3s. 3d. per gallon, and 90/140 grade 3s. 3d. to 3s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	7	to 0	7½	per gallon at works	
Motor ,,	1	2	,, 1	3	,,	,, ,,
Pure ,,	1	6	,, 1	7	,,	,, ,,

Trade Notes.

Gas Meters for Belgium.

The Bureau des Finances et des Service Industriels of Liège, Belgium, are inviting tenders until Jan. 9 for the supply of 200 20-light wet gas meters.

B. A. Holland Engineering Company, Ltd.

The business, including the goodwill, of Bernard Holland & Co. in air compressors, vacuum pumps, Diesel engines, and locomotives of all types, has been purchased and henceforth will be carried on by the B. A. Holland Engineering Company, Ltd.

General Refractories, Ltd.

General Refractories, Ltd., Sheffield, who have works in England and Scotland, have purchased the Levenseat sand and fireclay works and quarries at West Calder, belonging to Messrs. J. & T. Thornton, Hermand, West Calder. There are deposits of sand of high quality suitable for glass-making, furnaces, and other purposes, and the works have good transport facilities.

Contracts Advertised To-Day.

Gas Oil.

The Gas Committee of the Mansfield Corporation invite tenders for the supply of gas oil. [Advert. on p. 792.]

Diaries, Calendars, &c., Received.

Acknowledgment is made of the receipt from the following friends of seasonable gifts in the form of diaries, calendars, &c.:

Alder & Mackay, Ltd., New Grange Works, Edinburgh.
Gas Chambers and Coke Ovens, Ltd., Artillery House, Westminster, S.W. 1.
Gas Meter Company, Ltd., 238, Kingsland Road, London, E. 2.
Standard Furnace and Setting Company, 150, Lord Street, Southport.
Stanton Ironworks Company, Ltd., near Nottingham.
Staveley Coal and Iron Company, Ltd., near Chesterfield.
John G. Stein & Co., Ltd., Bonnybridge, Scotland.
John Thomlinson, Ltd., Stanley Works, Partick, Glasgow.
Wailes Dove Bitumastic, Ltd., Collingwood Buildings, Newcastle-on-Tyne.

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then 2 more
then 17 more
and now—
another 3!

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Following upon installations of 20 Thomas Calorimeters in various gas works of the Gas Light & Coke Company, we have now received orders for three more, to be installed at the Battersea, Cross Lane, and Richmond testing stations.

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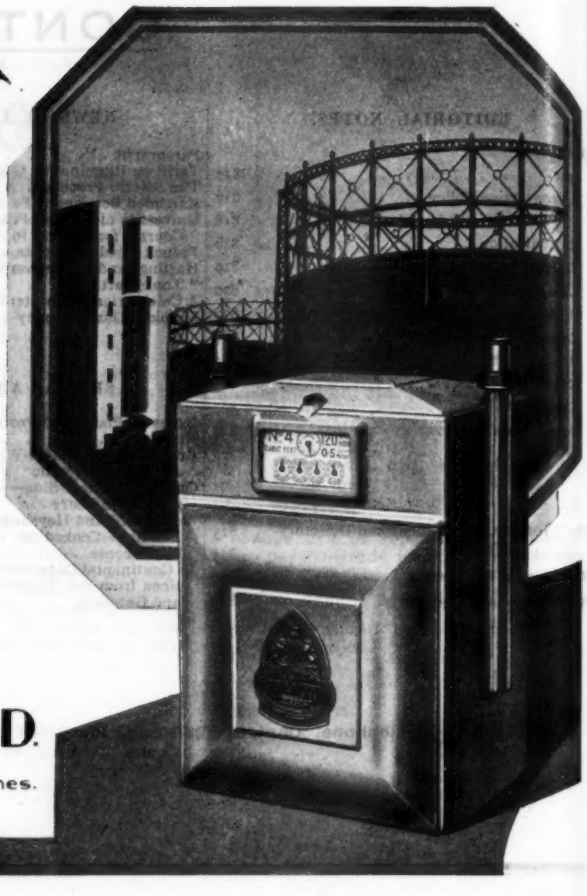

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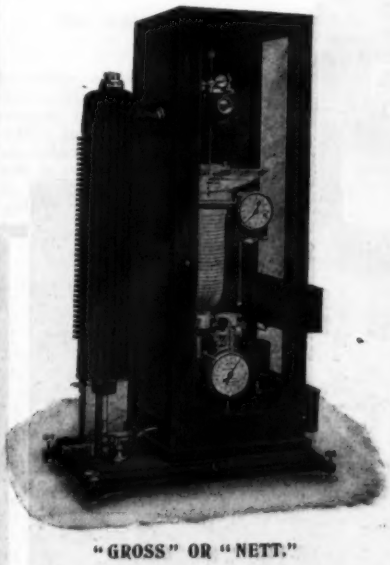

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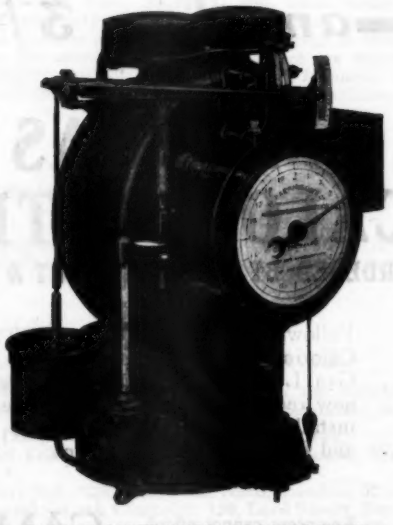

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